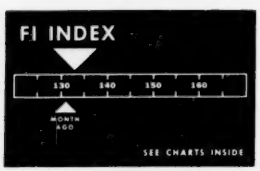
NATIONAL EDITION

Food Industries

For those who control quality and costs through management and production—a McGraw-Hill publication

Sanitary all-metal purifiers and efficient pneumatic conveyors in General Mills ultramodern Los Angeles flour mill. (Story inside)



MAY, 1949: How to develop a good package, Makes better low-solids gels, Nutritional advances, Saving $1,000,000, Advanced plant engineering

PACKAGE CHECK-LIST

Guide for Developing a Good Consumer Package

HOW TO USE THIS CHART

All factors pertinent to a new package are listed in the lefthand column below—in logical sequence. And designated by dots on the right are the departments responsible for each necessary phase of the package. Moreover, space is provided (left) where you may personally check factors relative to your own project.

While individual packaging problems differ, this compilation of ideas is so comprehensive that, with your own tailoring, it will give direct guidance in planning your package.

These factors are taken from actual experiences of both small and large food packers, makers of materials and equipment, and designers. They are applicable to development of all consumer containers—flexible or rigid.

PACKAGE DEFINITION

What constitutes a good consumer package?

A good consumer package is one which:

1. Adequately protects the quality of the product during necessary shelf-life in a given climatic region.
2. Can be handled efficiently in production and distribution.
3. Has high merchandising and consumer convenience values.
4. Keeps packaging costs at a minimum consistent with other essential requirements.

FOOD INDUSTRIES Editorial Supplement to Volume 21, Number 5, May 1949

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MANAGEMENT: Board of Directors, Owners, General Executives, President, Vice-Presidents, Secretary, Treasurer, Comptroller.

PRODUCTION: Plant Manager, Production Superintendent, Works Executives, Chief Engineer, Engineers, Foremen, Production Assistants, Control Laboratory.

RESEARCH AND DEVELOPMENT: Research Director, Chief Chemist, Food Technologist, Home Economist, Technical Librarian, Technical Assistants, Packaging Laboratory, Pilot Plant.

SALES AND ADVERTISING: Sales and Advertising (including Merchandising and Public Relations) Executives and Assistants.

PURCHASING: Purchasing Executives and Assistants.

LEGAL: Attorneys and Assistants.

YOUR ✓		MANAGEMENT	PRODUCTION	RESEARCH & DEVELOPMENT	SALES	ADVERTISING	PURCHASING	LEGAL
	I. WHY A NEW PACKAGE?							
	For a new product?	●	●	●	●	●	●	●
	For an established product?	●	●	●	●	●	●	●
	1. To improve protective functions which will:							
	Extend shelf-life	●		●	●			
	Protect product so package is:	●		●	●			
	Air-tight (hermetic)			●				
	Water/water-vapor resistant			●				
	Impermeable to gases and organic vapors			●				
	Sift-proof			●				
	Permeable (allowing for "breathing")			●				
	Insect and dust-proof			●				
	Light resistant			●				
	Protect from damage in handling	●		●	●			
	Protect package from product damaging	●		●	●			
	Grease resistant	●		●				
	Non-sticking	●		●				
	2. To strengthen sales appeal by—							
	New designs	●			●	●		
	Visibility	●			●	●		
	Colors	●			●	●		
	Raw materials	●			●	●		
	Family and/or brand identification	●			●	●		
	Legible, attractive type	●			●	●		
	Novelty	●			●	●		
	Good typographical layout	●			●	●		
	Shelf-display features	●			●	●		
	Simplicity	●			●	●		
	Quick recognition	●			●	●		
	Good use of selling space	●			●	●		
	Ease of handling	●	●	●	●	●		
	Shape	●	●	●	●	●		
	Size	●	●	●	●	●		
	Closures	●	●	●	●	●		
	Reclosures	●	●	●	●	●		
	Size of opening	●	●	●	●	●		
	Dealer and consumer acceptance	●			●	●		
	3. To meet changes in retail methods and outlets	●			●			
	4. To reduce costs (unit cost per package and amount of returned goods)	●	●	●	●	●		
	5. To step-up production — meet consumer demands	●	●		●			
	6. To take advantage of new developments in packaging technics	●	●	●				
	7. To meet competition	●	●	●	●	●		
	8. To meet changes in consumer requirements and buying habits	●			●	●		
	II. SOURCES OF IDEAS FOR NEW OR REVISED PACKAGES							
	Have you thoroughly explored all these idea sources?	●						
	1. Research & Development personnel	●		●				
	2. Engineering, Production & Operation personnel	●	●					
	3. Sales, Advertising & Merchandising staffs (including Field Sales force, Consumer Service studies, advertising agencies and opinion surveys of wholesalers, retailers and consumers)	●			●	●		
	4. Purchasing staff	●					●	
	5. Company suggestion-box program	●	●	●	●	●	●	●
	6. Manufacturers of packaging materials and equipment		●	●			●	
	7. Packaging consultants and designers	●	●	●	●	●		
	8. Packaging conventions and expositions	●	●	●			●	
	9. Technical and trade literature	●	●	●	●	●	●	●
	10. Competitor's packages	●	●	●	●	●		
	11. Packages of foreign manufacturers	●	●	●	●			
	12. Patents	●	●	●				●
	III. EVALUATING IDEAS FOR NEW PACKAGES							
	1. Is there any reason why this new package cannot be considered from a production standpoint? Does the package have to be designed to fit in with present operation? What production schedule is contemplated?	●	●					
	2. Is there any reason why this new package cannot be considered from sales, management or company viewpoints?	●			●	●		
	3. Does proposed package hold every promise of proving practicable? If not, are there any other packages to be considered?	●	●	●	●	●	●	●
	4. What is planned maximum shelf-life?	●		●	●			
	5. Where will package be sold? (regionally and type of distribution)	●			●			
	6. What packaging research would be required? Cost?	●	●	●	●	●		
	7. What prospective development is necessary? Cost?	●	●	●	●	●		
	8. Would any unusual production problems be involved?	●	●					
	9. Are any unusual legal or patent problems involved?	●						●
	10. Are required packaging materials and machinery available?	●					●	
	11. What are preliminary estimates of package cost?	●	●					
	Distribution costs?	●			●	●		
	Profit margins?	●	●		●	●	●	
	12. Will package lend itself to efficient materials handling (palletization, unit loads)?	●	●					
	IV. RESEARCH AND DEVELOPMENT							
	LABORATORY							
	What are the protective requirements of the product?			●				
	1. Product packaging tests			●				
	Moisture equilibrium			●				
	Free oil			●				
	Caking (moisture and temperature)			●				
	Flavor and odor retention			●				
	Abrasive quality			●				
	Chemical inertness			●				
	Free-flowing properties			●				
	Sifting properties			●				
	2. Testing for physical properties of packaging materials			●				
	Degree of flexibility and rigidity			●				
	Tensile strength			●				
	Bursting strength			●				
	Wet strength			●				
	Tear strength			●				
	Thickness			●				
	Folding endurance			●				
	Smoothness			●				
	Scuffing resistance			●				
	Blocking characteristics			●				
	Grease resistance			●				

(Continued in next column)

	M	PR	R	S	A	PU	L

YOUR ✓		MANAGEMENT	PRODUCTION	RESEARCH & DEVELOPMENT	SALES	ADVERTISING	PURCHASING	LEGAL
	IV. RESEARCH AND DEVELOPMENT (CONT'D)							
	Water-vapor transmission; Hygroscopicity			●				
	Gas permeability			●				
	Water and oil absorption			●				
	Opacity			●				
	Brightness of paper			●				
	Acid-alkali resistance			●				
	Light resistance			●				
	Performance under extreme temperatures (hot filling, freezing)			●				
	Flammability			●				
	Inks and adhesives			●				
	Free from foreign odors			●				
	Printability of material			●				
	3. Fabrication of sample packages			●				
	4. Testing for performance			●	●			
	Storage, shipping and distribution tests Laboratory storage tests under accelerated conditions			●				
	Simulating storage, distribution and merchandising conditions			●	●			
	Actual field tests (shipping and storage)			●	●			
	5. Taste panel testing of packaged product (organoleptic evaluation)	●	●	●	●	●	●	●
	Feel	●	●	●	●	●	●	●
	Mastication	●	●	●	●	●	●	●
	Texture	●	●	●	●	●	●	●
	Color	●	●	●	●	●	●	●
	Aroma	●	●	●	●	●	●	●
	After-taste	●	●	●	●	●	●	●
	Odor	●	●	●	●	●	●	●
	Taste	●	●	●	●	●	●	●
	General appearance	●	●	●	●	●	●	●
	ENGINEERING, PRODUCTION							
	1. Fitting package into production line:		●	●	●	●	●	
	What net production rate is needed (allowing minimum shut-down time)? Will present plant machinery adequately handle new package?		●					
	If so, how can existing line be most simply converted? Can operation be simplified without sacrificing package protective features?		●	●				
	If not, is machinery being made commercially to do the job? Can company engineers or development engineering concerns build necessary machinery?		●				●	
	How many machines are needed?		●					
	What floor space will be required?		●					
	Is line as automatic and continuous as possible and free from "bottlenecks?"		●					
	Can machinery be adapted to similar packages, also packages of different sizes?		●					
	Labor costs?		●					
	2. Production tests		●	●				
	Plant or pilot runs under actual operating conditions		●	●				
	Adequate quantities run to determine: Costs, also—	●	●				●	
	That there are no "bugs" in operations		●	●				
	That package from production line fulfills:							
	Laboratory specifications		●	●				
	Acceptance of consumer and dealer		●		●	●		
	Sales and merchandising features		●		●	●		
	Legal requirements (as in amount of fill variations)							●
	Field tests (shipping and distribution) Tests on machine-packed samples (comparison with laboratory field tests)		●					
	V. MERCHANDISING AND MARKETING							
	Sales and Advertising							
	1. Design and ease of handling		●		●	●		
	Is the size right (proper unit of purchase both for consumer and to meet competition)?				●	●		
	Does the package, size, and shape lend itself to good materials handling (for warehouser and retailer)?		●		●	●		
	What will be the channels of merchandising? Where and how should package be marketed?				●	●		
	Does package lend itself to window and counter displays?				●	●		
	Will package be introduced at a psychological time to stimulate sales?				●	●		
	Does package have "salability?"				●	●		
	Does design permit code dating (if desired)?		●	●	●	●		
	What designs are used by competitors?				●	●		
	Is design original, imaginative, distinctive, utilitarian, and in good taste?				●	●		
	Does package connote cleanliness and freshness? Has it eye and appetite appeal?				●	●		
	Is brand or family quickly identified?				●	●		
	Has selling space on package been advantageously used?				●	●		
	Is copy simple and convincing? Have practical recipes and instructions been included?				●	●		
	Will this package tie in with other packages in your advertising program? Is it adaptable to planned merchandising methods?				●	●		
	If design makes costly changes in packaging machinery necessary, will these changes meet new consumer buying habits so well that cost is warranted?				●	●		
	Does design comply with laboratory specifications?			●	●	●		
	2. Consumer and dealer acceptance				●	●		
	Have you pre-tested sufficiently to determine what consumer and dealer want?				●	●		
	Will package keep consumer goodwill and confidence?				●	●		
	Does package meet changing buying habits and needs of consumer?				●	●		
	Is package wholly convenient for housewife (opening, reclosing, and pouring devices)?				●	●		
	Does it have re-use value?				●	●		
	Does package contain practical kitchen preparation advice?				●	●		
	Does copy adequately describe contents of package?				●	●		●
	VI. LEGAL							
	Are any of packaging materials under government control?							●
	Does package meet municipal, state, and federal regulations?		●	●				●
	Will package meet food labeling provisions (municipal, state and federal)?		●	●				●
	Have you applied for package construction patents? Trademark registration? Copyright?							●
	VII. PURCHASING							
	Have packaging materials and equipment companies been contacted? Samples and costs?						●	
	How does package correlate with inventory control? What are minimum inventory requirements for economic production?		●	●			●	
	Have final materials and production specifications been drawn up—to meet needs of technical, production, and merchandising departments?		●	●	●	●	●	
	Has purchasing department been fully informed of all required specifications needed to draw up exact, accurate purchase orders?		●	●	●	●	●	
	Will supplies and machinery be delivered to meet production schedules?		●				●	
	VIII. FINAL APPRAISAL—THE "COMPROMISE"							
	Will package increase costs? If so, is increase justified?	●	●	●	●	●	●	
	If costs must be reduced, where will the sacrifice be made?	●	●	●	●	●	●	
	1. In design? Is design simplest one to give desired results?	●			●	●		
	2. In production line? Can package be adapted to a more flexible, automatic, continuous packaging line?	●	●					
	3. In protective features? Is there overpackaging?	●		●				
	In final analysis, are you satisfied with your "compromise" package?	●	●	●	●	●	●	●

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DID YOU KNOW THERE WERE 5 WORLDS?

— and that one of these five is the best Labeler in the WORLD for you

World BEE-LINE is for high production, high quality application of labels to glass packed foods, condiments, wines, spirits, drugs, cosmetics and many other products. It applies all kinds and sizes of labels to all kinds and sizes of glass containers. Production up to two a second.

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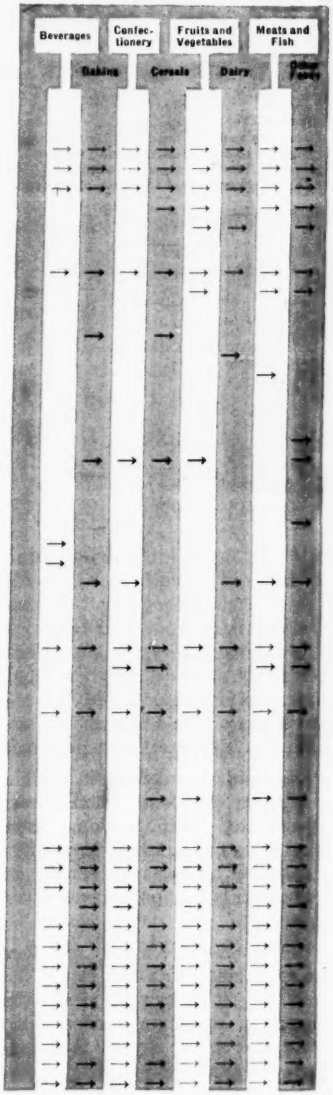

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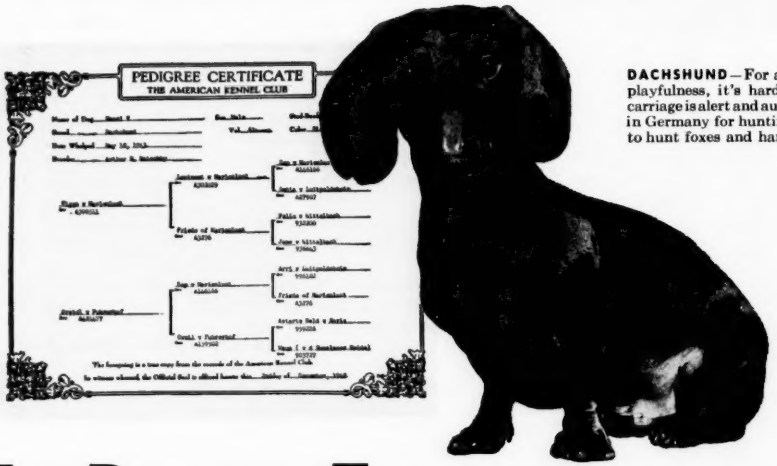
A Pedigree is a Promise of Quality



DACHSHUND—For affection, responsiveness and playfulness, it's hard to beat a dachshund. His carriage is alert and audacious. Originally developed in Germany for hunting badger, he can be trained to hunt foxes and hare, and track wounded deer.

In Boxes, Too . . . . .

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Tremendous forest resources, four modern box plants and five of the nine largest paper machines in the world make Union a dependable container source for any large volume shipper.

That's why, every month, more makers of famous brand products ship in Union boxes.

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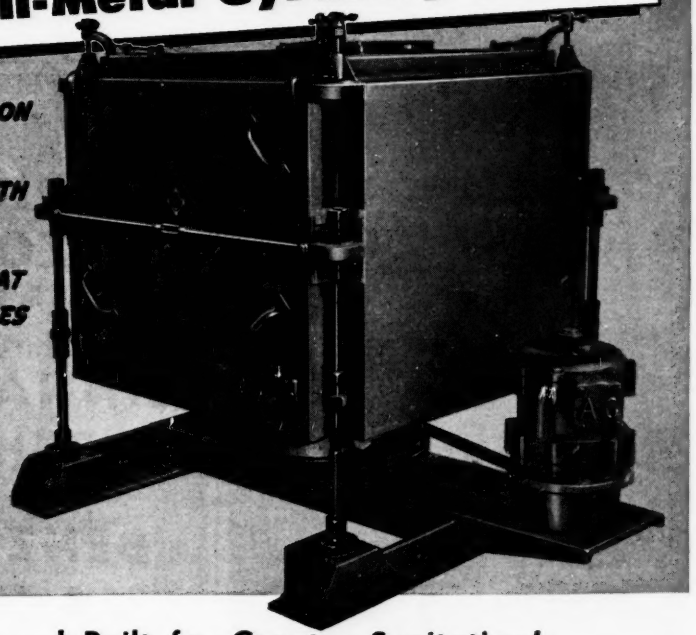
★ GREATER SANITATION

★ INCREASED STRENGTH

★ CAN BE OPERATED AT HIGH TEMPERATURES

★ EASIER TO CLEAN

★ AVAILABLE NOW



Designed and Built for Greater Sanitation!

HERE's a new *Low-Head* gyratory sifter for the food processing industry . . . made entirely of metal, light in weight and built strong for long, dependable operating life. All riveted joints are gasket-sealed. There are no cracks, no crevices — and no chance for leakage of fine materials.

It's a high speed, high capacity unit — specially designed to give you *greater sanitation* in the grading and resifting operations in your plant. The entire machine can be cleaned quickly and easily . . . and all parts can be safely washed.

Light weight metals are used throughout, contributing to smooth sifter performance and exceptionally low maintenance. And you can operate the sifter at high temperatures because there are no wooden parts. Each sifter holds 4 to 7 sieves . . . is powered by a 1 hp explosion-proof Allis-Chalmers motor with Texrope Drive.

They're available *now*—ready for prompt delivery!

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Send coupon at right for further details on the new Allis-Chalmers all-metal gyratory sifter. Ask for the handy packet—with advance information on this sifter and a copy of bulletin 06B6124A on the standard Low-Head gyratory sifter. If you so indicate, an Allis-Chalmers representative will call. No obligation.

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MILWAUKEE, WIS.

☐ Please send handy packet with information on new All-Metal sifter and standard sifter bulletin 06B6124A.

☐ Would like personal visit from A-C representative with details of new sifter.

Name .....

Company .....

Street .....

City ..... State .....

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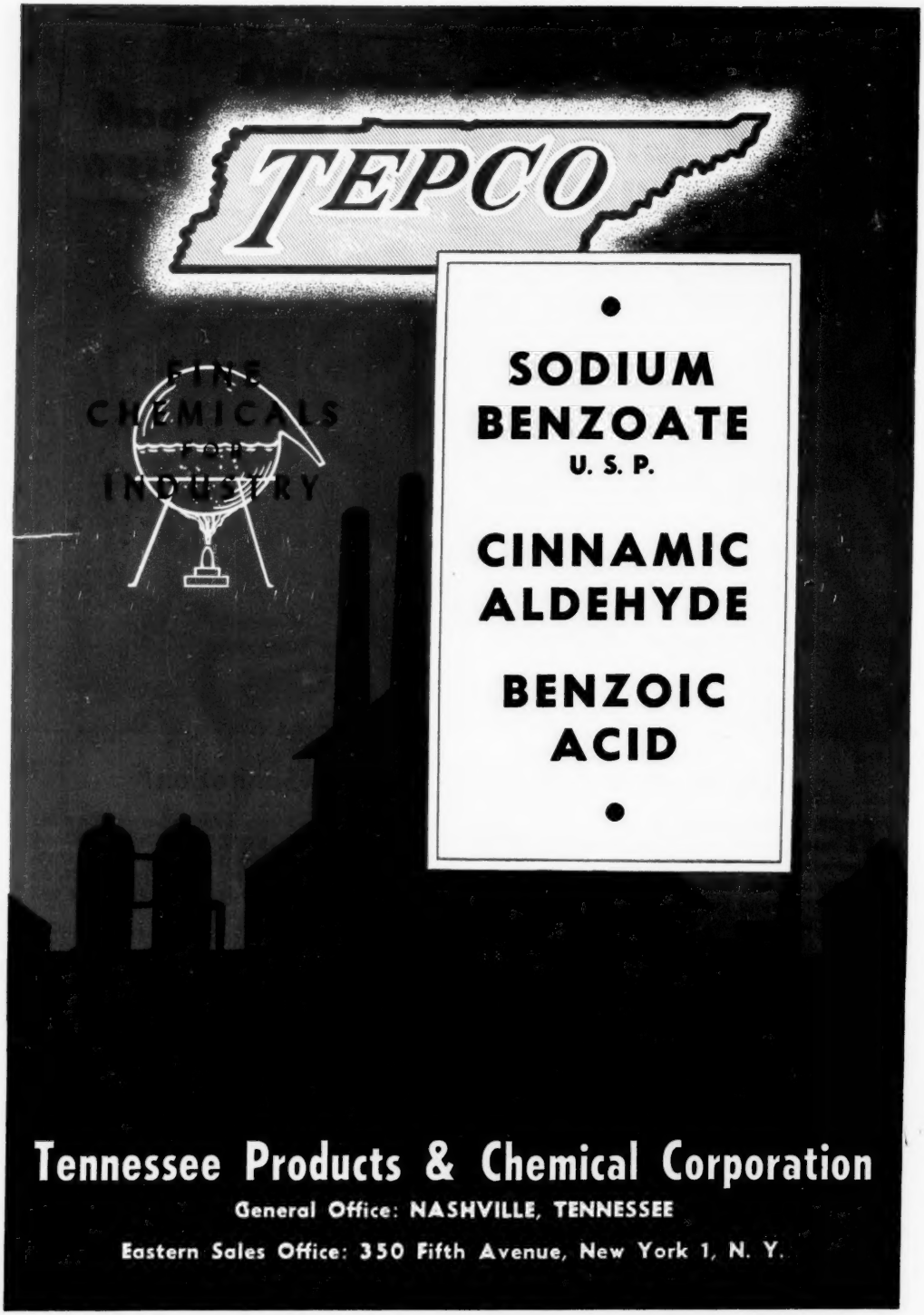
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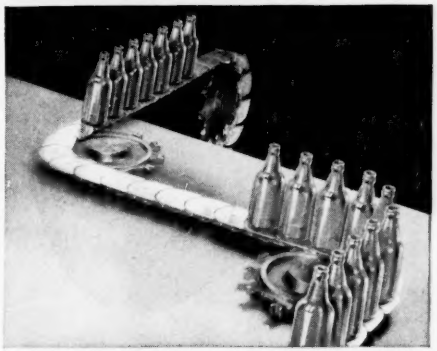
LINK-BELT ROLLER CHAIN CONVEYORS

LINK-BELT FLAT-TOP

For handling bottles, jars and cans through cleaning, filling, capping and labeling operations. The chain, through its freedom of articulation, prevents "humping" as the chain links remain at uniform height. When progress of containers is halted, continued chain travel will not disarrange them.

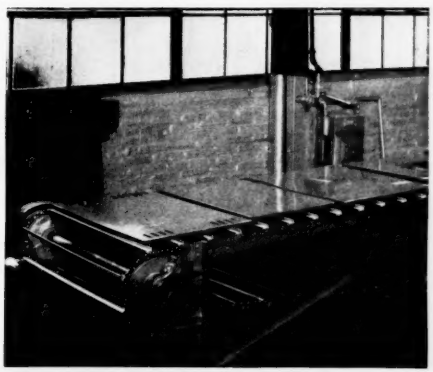
LINK-BELT UNIVERSAL CARRIER

The flexible adaptability of this chain with its ease of installation and operation in confined places has made it a favorite for bottling and canning operations. Permits sprocket engagement in two planes. In rectangular, semi-circular or irregular paths, or as one long conveyor, instead of using several transfer conveyors with individual driving mechanisms.



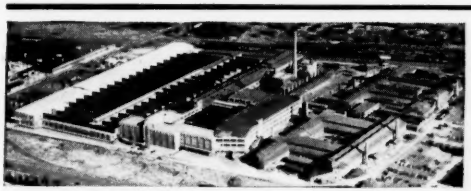
LINK-BELT EXTENDED PIN

Extensively used for timing and conveying purposes. Accurate spacing yet economical arrangement for mounting tubing or special flights between two parallel chains. Available for standard and extended pitch chains.



11.437

LINK-BELT COMPANY Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.



LINK-BELT

ROLLER CHAINS & SPROCKETS

World's largest makers of Chains for Power Transmission and Conveying

Easy to STORE

Easy to POUR

AVAILABLE IN SIZES FROM 2 TO 25 LBS.

DELTASEAL: Reg. U.S. Pat. Off.

TWO FEATURES THAT MAKE SALES FOR FOODS IN

Bemis Deltaseal Bags

This attractive, low-cost package not only gives sales-inviting display in stores, but also helps keep customers sold on your brand after they're home.

Women like Deltaseal Bags because the square-pack bag rests well on pantry shelves, and the Deltaseal spout makes it easy to pour direct from the bag without spilling.

Your Bemis representative will be glad to show you how Deltaseal Bags and the Deltaseal Packaging System can help you increase food sales. Get in touch with him now.

COTTON · BURLAP · PAPER BAGS · ESTABLISHED 1858 · BEMIS BRO. BAG COMPANY

Bemis

"America's No. 1 Bag Maker"

Baltimore • Boise • Boston • Brooklyn • Buffalo • Charlotte • Chicago • Cleveland • Denver • Detroit • East Pepperell • Houston • Indianapolis • Jacksonville, Fla. • Louisville Kansas City • Los Angeles • Memphis • Minneapolis • Mobile • New Orleans • New York City • Norfolk • Oklahoma City • Omaha • Peoria • Phoenix • Pittsburgh Salina • St. Louis • Salt Lake City • San Francisco • Seattle • Wichita • Vancouver, Wash. • Wilmington, Calif.

Simple as pinching a rubber tube

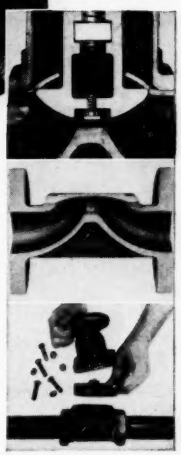
A GRINNELL-SAUNDERS DIAPHRAGM VALVE works on a simple principle . . . it pinches tight for positive closure and opens wide for streamlined flow. The working parts of the valve are completely isolated from the fluid . . . no corrosion, no contamination and no leaks. Choice of diaphragm material. Body materials . . . cast iron, malleable iron, bronze, aluminum, stainless steel. Body linings . . . glass, lead, rubber or synthetics.

NO METAL-TO-METAL SEAT . . . The large contact area on which this flexible diaphragm seats gives positive closure even when grit, scale or other solid matter is temporarily trapped.

MINIMUM RESISTANCE TO FLOW . . . Smooth streamlined fluid passage without pockets prevents accumulation of sludge and reduces friction resistance to a minimum.

MAINTENANCE REDUCED . . . The diaphragm is the only part that normally wears out. Replaced in a few minutes without removing valve from line.

Available in various combinations of valve bodies and operating mechanisms.



99 YEARS PIPING

GRINNELL

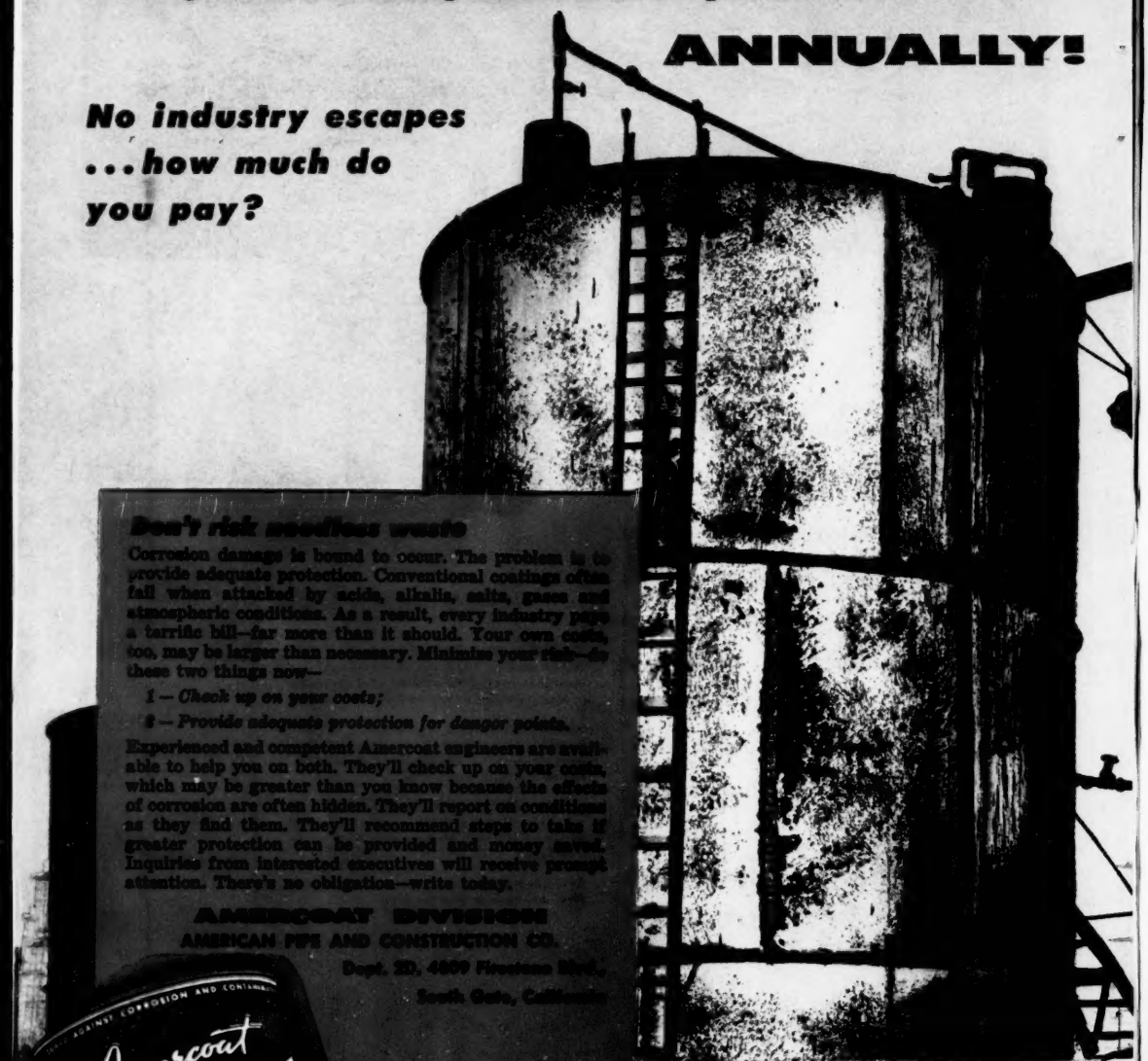
Grinnell Company, Inc., Providence 1, Rhode Island. Branches: Atlanta • Buffalo • Charlotte • Chicago • Cleveland • Cranston • Fresno • Kansas City • Houston Long Beach • Los Angeles • Milwaukee • Minneapolis • New York • Oakland • Philadelphia • Sacramento • St. Louis • St. Paul • San Francisco • Seattle • Spokane

CORROSION COSTS

$6,000,000,000.00

ANNUALLY!

No industry escapes ...how much do you pay?



Don't risk needless waste

Corrosion damage is bound to occur. The problem is to provide adequate protection. Conventional coatings often fail when attacked by acids, alkalis, salts, gases and atmospheric conditions. As a result, every industry pays a terrific bill—far more than it should. Your own costs, too, may be larger than necessary. Minimize your risk—do these two things now—

1 — Check up on your costs;

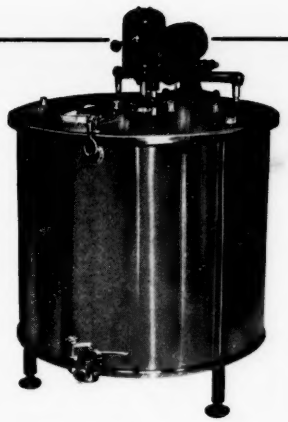
2 — Provide adequate protection for danger points.

Experienced and competent Amercoat engineers are available to help you on both. They'll check up on your costs, which may be greater than you know because the effects of corrosion are often hidden. They'll report on conditions as they find them. They'll recommend steps to take if greater protection can be provided and money saved. Inquiries from interested executives will receive prompt attention. There's no obligation—write today.

AMERCOAT DIVISION
AMERICAN PIPE AND CONSTRUCTION CO.
Dept. 2D, 4809 Firestone Blvd.,
South Gate, California

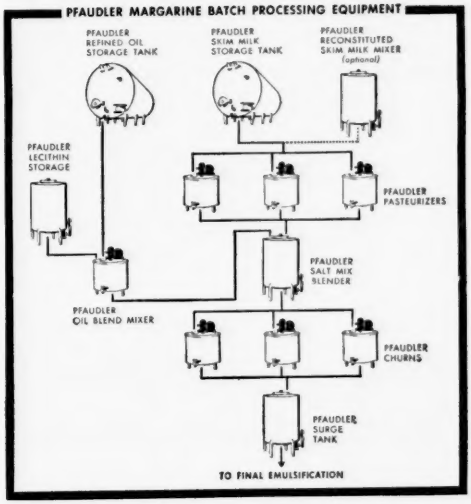
FOLLOW THE LINE OF *most* RESISTANCE

A SYSTEM OF SURFACE PROTECTION



Sanitary Pfaudler stainless steel (or glass-lined steel) self-draining pasteurizers and churns. Jacketed for heating or cooling and fully insulated. Equipped with 2-speed agitator, motor-driven. Agitator lifts out of vat with opening of cover. Easy to clean. Standard capacities—100 to 500 gallons.

A Better Oleomargarine WITH SANITARY Pfaudler PROCESS EQUIPMENT!

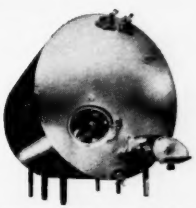


Leading margarine manufacturers—Durkee Famous Foods, Churn-Gold, Blue Bonnet, and Nucoa to mention a few—are using Pfaudler stainless steel or glass-lined steel margarine process equipment with excellent results. Sanitary inside and out, as well as corrosion-resistant, it prevents off flavors and oxidation.

Many prefer Pfaudler acid-resisting glass-lined steel equipment for handling refined oils. Oils with a fatty acid content from .05 to 5% are corrosive, often causing surface pitting. Once pitting starts, it is impossible to remove all of the oxidized oil from a pitted surface without resorting to the use of harsh cleaners. Any remaining residue contacting fresh oil greatly damages its keeping qualities. Glass-lined tanks are, therefore, highly desirable because of their acid-resistance and easy cleanability.

But whether you select glass-lined steel or stainless steel, Pfaudler designs meet the strictest Board of Health requirements. There are no obstructions or crevices inside any unit to make cleaning difficult. All outside surfaces are ground smooth and are either all-welded polished stainless steel or painted. Moisture cannot penetrate insulation. It is standard in design, available for prompt delivery for the operations shown in flow sheet. Your inquiries are invited.

Sanitary Pfaudler stainless steel self-draining un-jacketed mixer-blender. Equipped with agitator, motor drive, outlet valve, cover.



Sanitary Pfaudler self-draining storage tank. glass-lined steel or stainless steel construction. Available with or without insulation. Equipped with 2-speed agitator, motor-driven. inside-outside swing manhole door, inlet and airvent fitting, electric light and observation fitting. Capacities up to 10,000 gallons.

Pfaudler

THE PFAUDLER CO., Rochester 3, N. Y. Branch Offices: 330 West 42nd St., New York 18, N. Y.; 111 W. Washington St., Chicago 2, Ill.; 1325 Howard St., San Francisco 3, Calif.; 818 Olive St., St. Louis 1, Mo.; 63 West Milwaukee Ave., Detroit 2, Mich.; 1318 1st Nat'l Bank Bldg., Cincinnati 2, O.; 1041 Commercial Trs. Bldg., Philadelphia 2, Pa.; 751 Little Bldg., Boston 16, Mass.; 334 Chattanooga Bank Bldg., Chattanooga, Tenn.; P.O. Box 4066, Dallas, Texas; Enamelled Metal Products Corp., Ltd., Artillery House, Artillery Row, London, S. W. 1, England.

THE PFAUDLER CO., ROCHESTER 3, NEW YORK

ENGINEERS AND FABRICATORS OF FOOD PROCESSING EQUIPMENT

Glass-Lined Steel . . . Stainless Steels . . . Nickel . . . Inconel . . . Monel Metal

Which has Longer Keeping Qualities?

The Answer is one of 11 reasons Why You Should Use

MM&R SPICE OILS, the MODERN Method of FLAVOR CONTROL

Leading food packers have *proved through use* that products have better keeping qualities . . . stay brighter-colored, cleaner-looking longer, when MM&R Spice Essential Oils are used to replace crude spices.

MM&R Spice Essential Oils, in glass or cans, can never become contaminated — can never introduce spoilage-causing foreign materials into your food products.

Think it over! And consider, too, the eleven other sound reasons for using MM&R Spice Oils. Then discover for yourself why each year finds more and more food producers switching from old-fashioned flavoring methods to the *modern* flavor control afforded by MM&R Spice Essential Oils.

1. Uniformity of quality and flavoring
2. No color disturbance
3. Less bulk in storage
4. Less weight in shipping
5. No danger of molding
6. No loss by exposure in package while being stored
7. No starch introduced into your product
8. Ease of handling
9. Less cost as compared to equivalent spice value
10. Entire flavor available immediately
11. Elimination of the possibility of dust and dirt

Send for "Table of Equivalents" Showing Comparative Flavoring Strengths of Whole Spices and Spice Oils

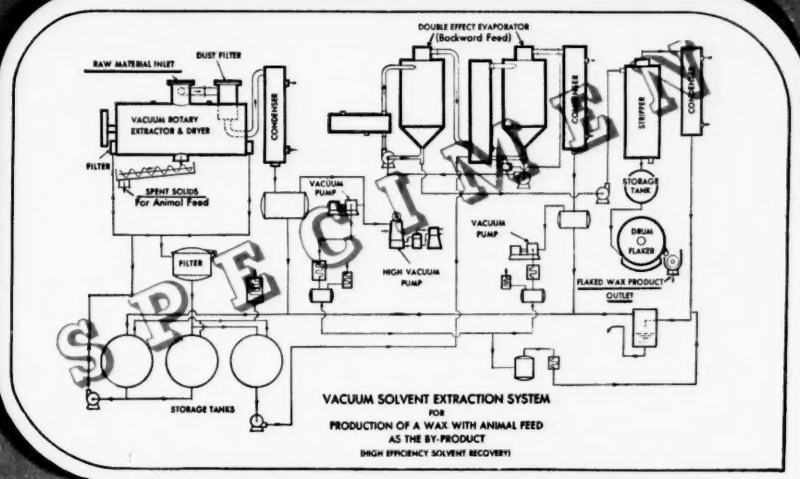
MAGNUS, MABEE & REYNARD, INC.

SINCE 1895 . . . ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS

16 DESBROSSES STREET, NEW YORK 13, N.Y. • 221 NORTH LASALLE STREET, CHICAGO 1, ILL.

Los Angeles: Braun Corp. • Seattle, Portland, Spokane, Van Waters and Rogers, Inc. • San Francisco: Braun-Knecht-Heimann Co.

ASK STOKES — A Problem-Solving Service for You



VACUUM SOLVENT EXTRACTION SYSTEM
FOR
PRODUCTION OF A WAX WITH ANIMAL FEED
AS THE BY-PRODUCT
(HIGH EFFICIENCY SOLVENT RECOVERY)

MANUFACTURER'S Problem: What can I do with 100 tons of waste that we dump every day from our plant at heavy cost for trucking?

That's the sort of problem that Stokes' engineers like to tackle.

Above you see a simplified Stokes Flowsheet showing a Vacuum Solvent Extraction plant for producing a wax, with animal feed as a salable by-product.

Whether your problem concerns human food or animal feed, Stokes Advisory Service will help solve it.

This service does not merely recommend equipment (though it does that)... nor merely advise on pre-treatment of raw materials (though it does that)...nor merely instruct on how to use equipment (though it does that).

Stokes gives you a complete plan... proved equipment, tested methods, proper installation, instructions to workers, and COSTS...before you invest in the process. F. J. Stokes Machine Company, 5976 Tabor Road, Philadelphia 20, Pennsylvania.

Stokes makes Vacuum and Special Processing equipment, High Vacuum Pumps and Gages, Pharmaceutical equipment, Industrial Tabletting and Powder Metal Presses, Plastics Molding Presses, Water Stills and Special Machinery.

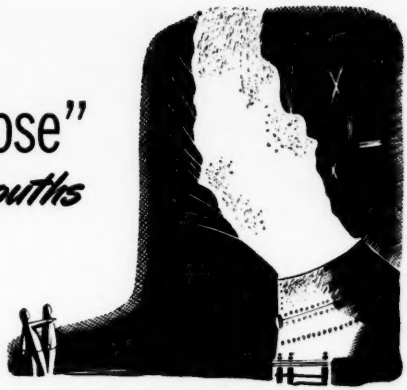
STOKES KNOWS HOW

They hit it "On the Nose"

—with their eyes, ears and mouths

The Not-So-Musical-Note Test

A rock driller has an ear for his drill. And it is an ear that must know the true pitch . . . because the best way to tell if a drill is operating most efficiently is by the *sound*, not the feel, of the drill.



The Hot-Flash Test. It's really amazing, but by watching the color of the gas blowout from a Bessemer converter, the keen sharp eye of an expert steel man can always tell when the process is completed.

The Sip Test. A big trade depends on a tiny sip . . . and tea companies pay high salaries to men just to sip or sniff. Accurately, the sensitive palates of these tasters can always tell tea at its best.

The Cover Test

When a one coat job is all that is necessary to make the interior of your plant look like new, what paint will do the job best? Don't guess. Test! Compare any good paint with Barreled Sunlight. Paint a few square feet with each, side by side on a wall. The next morning, when the paint is dry, your eye will plainly tell you that Barreled Sunlight covers better. Yes, and *Barreled Sunlight will last longer, will stay fresh-looking longer, will cost you less for both PAINT AND LABOR than any other paint on the market.*

Want positive proof? Write and your nearest Barreled Sunlight representative will show you exactly what we mean.

U. S. GUTTA PERCHA PAINT COMPANY
37-E Dudley St., Providence, R. I.

Barreled Sunlight

Paints

In whitest white or clean, clear, pleasing colors, there's a Barreled Sunlight Paint for every job

BEVERAGES
PIES • CAKES
CANDIES • CANDIE
ICE CREAM • SHERBETS
CANNED AND FROZEN FOO
JAMS • JELLIES • JAMS • J
MEAT CURING • MEAT CURING
BEVERAGES • BEVERAGES • BEVE
• CAKES • PIES • CAKES • P
CANDIES • CANDIES • CAN
• FOUNTAIN SYRUPS •
FROZEN FOODS • C
• JELLIES • JAMS

REFINED LIQUID SUGAR TO BE AVAILABLE IN MORE AREAS; MANY ADVANTAGES OVER DRY, BAGGED SUGAR; BIG SAVINGS

Ion-Exchange Process Makes Possible Small-Scale Local Refineries

HIGH FREIGHT CHARGES AVOIDED

NEW YORK, February—Liquid sugar is becoming available in areas other than those located near the large sugar-refining centers. Liquid sugar is about ⅓ water and, while the seller only charges for the sugar, transportation charges must be paid on the water as well, thus limiting the sale of this very desirable product to relatively small areas close to production points. Because conventional refining methods require high capital investment and tremendous volume, to produce economically, there are only a few sugar refineries in the United States located in Boston, New York, Philadelphia, Baltimore, Savannah, New Orleans, San Francisco, and Sugarland, Texas. These vast plants cannot ship a liquid product more than a few hundred miles inland, and many of them do not produce liquid sugar at all. This has deprived large sections of the country of a cheap and easily handled product.

A new process developed by American Cyanamid Company, ion-exchange sugar refining, now makes liquid sugar available anywhere. Already, two plants are operating in Chicago and one in Milwaukee; one is being built in St. Louis; and others are in prospect. Ion-exchange liquid sugar plants produce economically at a fraction of the volume required by conventional refineries, and may be built for a fraction of the cost. By serving only a local community, freight on water becomes unimportant. It is expected that eventually the United States will be dotted with ion-exchange liquid sugar plants, bringing advantages in cost, cleanliness, and ease of handling to all industrial sugar users.

Liquid Sugar Reported Easier, More Sanitary, Cheaper To Handle

INDUSTRIAL USERS BENEFIT

NEW YORK, February—To switch from dry to liquid sugar, the only equipment expense involved for the user is the installation of storage tanks and piping—cost of which is reported more than offset by the elimination of these costly steps: unloading, storing, and opening of sugar bags, dumping sugar into kettles, dissolving it in hot water, and sometimes filtering it, and counting, bundling and returning the bags for credit. For example, one plant, which formerly used 350 bags of sugar per day, reported that a labor gang of *five men* was required for handling dry sugar. Only *one man* was needed when liquid sugar was adopted. Liquid sugar is also more sanitary, and helps keep the plant looking cleaner; it is handled in an entirely closed system. Whereas dry sugar has to be weighed in, liquid sugar can be metered in—easily and precisely—by the turn of a valve.

Cyanamid's ion-exchange process can produce from raw sugar a refined liquid sugar which is equal to refined white sugar dissolved in water, in color, odor and taste, and better in ash content. It can also produce less highly refined liquids, at a saving to the user. For example, if a slightly colored liquid is not objectionable, it can be produced for less than a water-white liquid; and, unlike colored liquids produced by conventional methods, it will not retain any molasses taste.

The versatility of the ion-exchange process has been amply demonstrated by its successful use in making various qualities of liquid sugar, from high-sucrose liquids to 100% invert, in concentrations ranging up to 75° Brix.

AMERICAN Cyanamid COMPANY

ION EXCHANGE PRODUCTS DEPARTMENT • 30 Rockefeller Plaza, New York, 20, N. Y.

☐ Is liquid sugar produced by ion exchange available in our area?

☐ We are interested in making liquid sugar in our own plant, and would like a rough estimate of initial cost and operating cost . . . and the savings we can expect to effect.

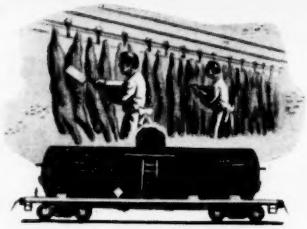
Use.....tons per day (working day of.....hrs.) for estimate.

Name.....

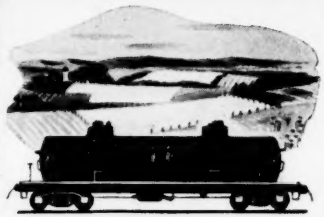
Company.....

Address.....

COTTONSEED OIL

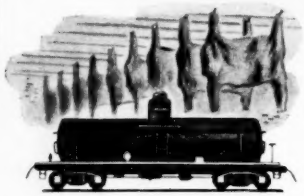


LARD



LINSEED OIL

for bulk liquid shippers
GATX Tank Cars
offer safe, economical transportation



TANNIC ACID

DESIGNED, BUILT
OPERATED and
MAINTAINED by

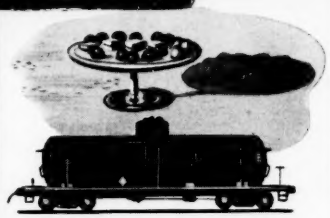
GENERAL AMERICAN
TRANSPORTATION CORPORATION

135 South LaSalle Street Chicago 90, Ill.

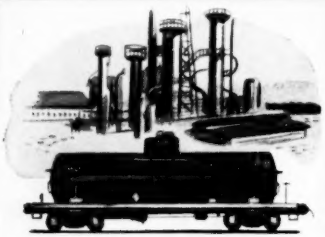
District Offices: Buffalo • Cleveland • Dallas • Houston
Los Angeles • New Orleans • New York • Pittsburgh
St. Louis • San Francisco • Seattle • Tulsa • Washington

Export Dept., 10 E. 49th St., New York 17, New York

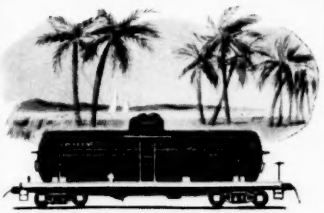
GATX GENERAL AMERICAN TRADE MARK



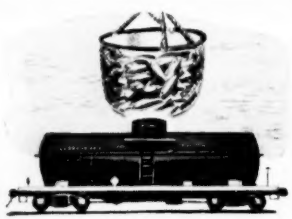
CORN SYRUP UNMIXED



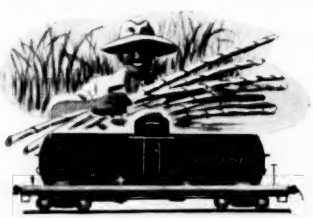
CORN OIL



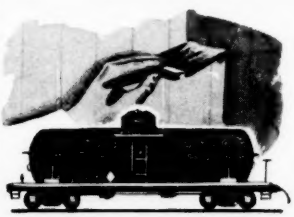
COCONUT OIL



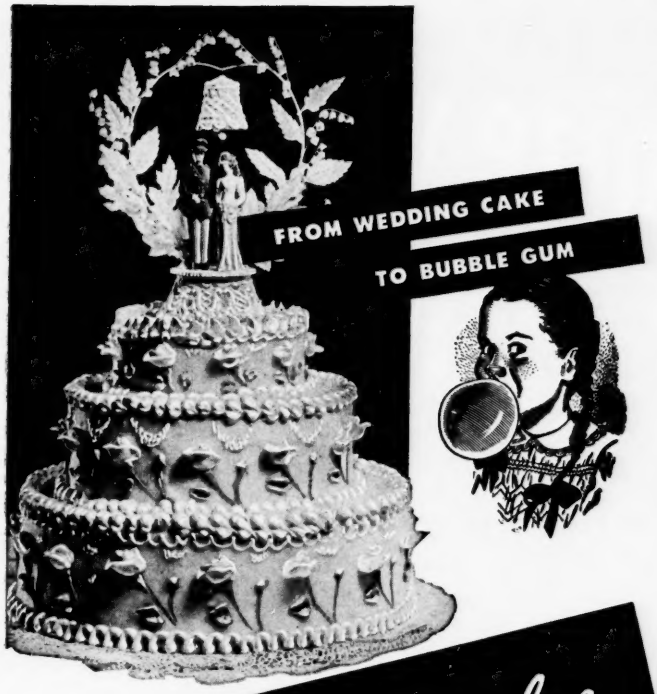
FISH OIL



MOLASSES



TUNG OIL



Nothing takes the place of Glycerine

Because—Glycerine is a wholesome humectant . . . retaining freshness, improving texture in cakes and breads . . . avoiding graining in icings, toppings, marshmallow fillings . . . preventing hardening in jams, jellies, candies, chewing gums.

Because—Glycerine is a food . . . digesting normally to supply energy in much the same way as sugars and fats.

Because—Glycerine is a solvent and blending agent . . . improving the palatability, sharpening the distinctive tastes of flavoring preparations. Glycerine is a sweetening agent, a preservative. Its well-proved versatility can be matched by no other product.

That's why in the food industry—and in *all* industry—for today's products—and for tomorrow's—*Nothing takes the place of glycerine!*

GLYCERINE PRODUCERS' ASSOCIATION
295 Madison Avenue
NEW YORK 17, NEW YORK

Technical GLYCERINE NEWS

COMPRESSED FOODS THAT ARE FRIABLE. Major problem of compressed food manufacturers is friability. One answer is the use of a small quantity of glycerine prior to compression. The glycerine is said to produce a firm product which can be easily broken when ready for use. (F-1)

★ ★ ★

A NON-TOXIC REFRIGERANT. A refrigerant mixture, particularly suited for use with foodstuffs because it has no objectionable taste and is edible, may be prepared from glycerine and water. (F-2)

★ ★ ★

NEW SUBSTITUTE FOR CORKS. Closures for foodstuffs may soon be made with a new cork substitute in which glycerine is an essential ingredient. The new product is claimed to have bulk density and resilience comparable to natural cork. (F-3)

★ ★ ★

GLYCEROL VISCOSITIES TABLE AVAILABLE. Miner Laboratories, headquarters for the Glycerine Producers' Association program of glycerine research, has prepared a table of viscosities of glycerol in aqueous solution from 0 to 100 per cent, at from 0 to 100 degrees C. You can obtain your copy by checking item F-4 on the coupon below. (F-4)

★ ★ ★

SECRET OF NEW QUICK-METHOD CAKES. The potent ingredient in the new quick-method cakes is a shortening containing a glycerine compound. This shortening makes possible the use of more sugar and milk to improve the cake. (F-5)

★ ★ ★

PLANT SAFETY HINT. If your workers use safety goggles, glycerine is a must. It's one of the best anti-fogging agents—and it's a good lens cleaner, too. (F-6)

GLYCERINE PRODUCERS' ASSOCIATION, DEPT. 8
295 MADISON AVENUE
NEW YORK 17, N. Y.

I should like to receive more information on the source of the items appearing in Technical Glycerine News. I have checked below those items which interest me.

☐ F-1 ☐ F-2 ☐ F-3 ☐ F-4 ☐ F-5 ☐ F-6

NAME .....

COMPANY .....

ADDRESS .....

modernize your power system the load-center way

—for better power utilization today, lower-cost expansion tomorrow!

To help offset today's squeeze on food processing profits, load-center power distribution can bring you cost-saving features that mean plenty. This modern method of distributing incoming power—at high voltage from a master unit substation to small unit substations located in the heart of load areas—offers you:

High equipment efficiency. You eliminate excessive voltage drop caused by long low-voltage feeder runs—voltage drop that slows down conveyors, dims lights, reduces oven heat.

Ease of change and expansion. You can shift processing lines, or add new ones, without being tied down by an inflexible power system. And unit substations are easy to move, if your plant must be relocated or rearranged.

Personnel safety. All equipment is metal-enclosed and effectively grounded, with no exposed parts to create a hazard.

Reduced maintenance costs. There are no exposed, dust-catching cables or devices to require frequent cleaning and servicing.

Space-saving compactness. Unit substations take up less space than separate components. With no special protection needed, they can go anywhere near load centers—along walls, in basements, on balconies, or roofs.

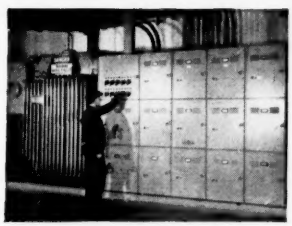
Easy installation. Factory-assembled and tested, unit substations come ready to install without delay. And generally, an installed General Electric load-center system costs less than older, piecemeal methods!

If you're planning to put in a new power system, or modernize an existing one, why not consult a General Electric application engineer? Familiar with food processing needs, he'll gladly work with you on a one-line diagram as a first step. Meanwhile, send for illustrated booklet, "What load-center power distribution can do for you." *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

POWER DISTRIBUTION SYSTEMS FOR FOOD PLANTS

GENERAL ELECTRIC

Placed close to loads, unit substations eliminate the 10-20% voltage drop common to long, low-voltage feeders. In this Midwest beet sugar plant, a G-E unit substation supplies power for controlling diffuser, washer house, beet receiving area, and pulp drying equipment.



Compact and space-saving, unit substations come ready for quick, inexpensive installation. Here, another G-E unit substation supplies power to centrifugals, granulators, and other dry sugar machines.

SEE THIS FILM!

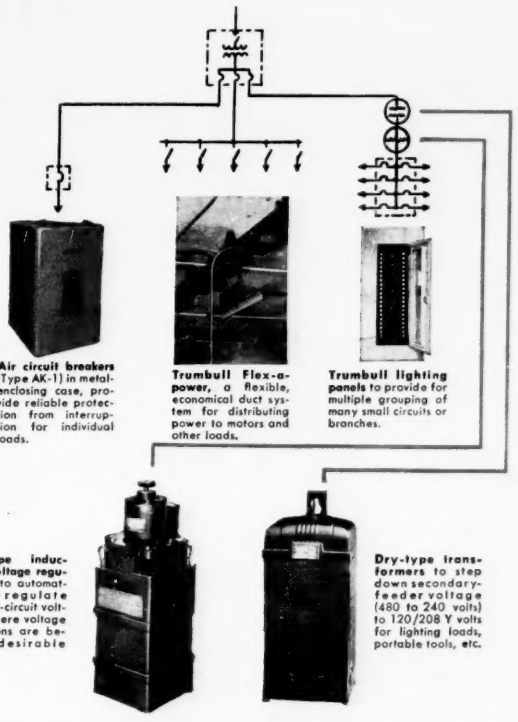
A G-E color sound slidefilm, "Modern Industrial Power Distribution," presents the whole story on load-center distribution. Ask your nearest G-E office about showing it to your personnel.

More Power to America

WHEN YOU GO "LOAD CENTER" GO GENERAL ELECTRIC *ALL THE WAY*

Complete General Electric load-center unit substations for food plants include a metal-clad incoming-line section with magne-blast power circuit breakers, a Pyranol transformer section, a low-voltage feeder section with drawout air circuit breakers, current transformers, buses, protective and disconnecting devices—all co-ordinated into one compact, easy-to-install unit.

In addition, the following associated equipment for load-center systems can also be provided by General Electric where desired—to make it G-E all the way:



Air circuit breakers (Type AK-1) in metal-enclosing case, provide reliable protection from interruption for individual loads.

Trumbull Flex-a-power, a flexible, economical duct system for distributing power to motors and other loads.

Trumbull lighting panels to provide for multiple grouping of many small circuits or branches.

Dry-type induction voltage regulators to automatically regulate lighting-circuit voltage where voltage variations are beyond desirable limits.

Dry-type transformers to step down secondary-feeder voltage (480 to 240 volts) to 120/208 Y volts for lighting loads, portable tools, etc.

WANT MORE DATA?

General Electric Company, Section A652-1
Apparatus Department, Schenectady 5, N. Y.

Please send me the following bulletins:

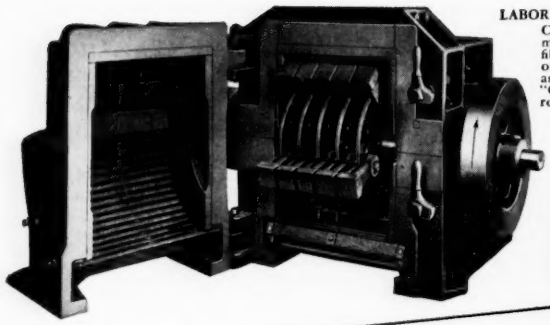
- ☐ GEA-3758—Load-center power distribution
- ☐ GEA-4322—Electric equipment for the food industry

Name.....

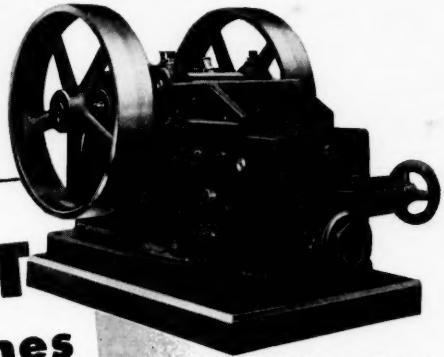
Company.....

Street.....

City..... State.....



LABORATORY SWING-SLEDGE MILLS
Capable of reducing soft, moderately hard and tough or fibrous materials to any degree of fineness between 1 in. and 20 mesh. The patented "Open-Door" feature permits ready accessibility for cleaning.



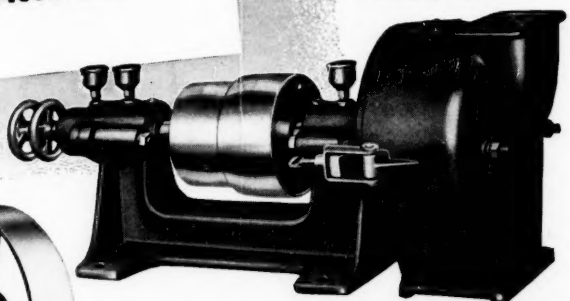
STURTEVANT

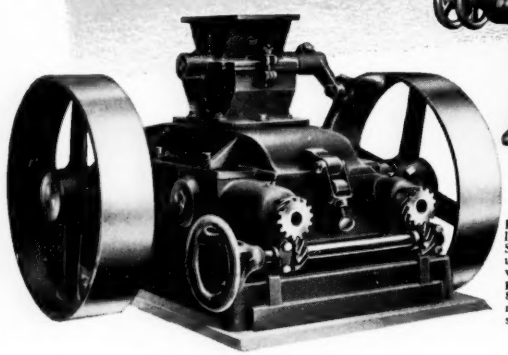
Laboratory Machines

Assure Quality of Products

Fast - Economical - Accurate

LABORATORY JAW CRUSHERS
Special Roll Jaw action simplifies close regulation of the product with capacities varying from 300 or 400 lbs. per hour at finest settings, to 1000 or 2000 lbs. when opened for coarser work. Each part of the crusher is accessible for quick and easy cleaning.





LABORATORY CRUSHING ROLLS
First designed especially for laboratory sampling work, Sturtevant Crushing Rolls are used regularly in many plants where there are limited outputs. Range of output for the 8 x 5 size is from $\frac{1}{2}$ in. to 20 mesh — and for the 12 x 12 size from $\frac{3}{4}$ in. to 20 mesh.

LABORATORY SAMPLE GRINDER
Laboratory Sample Grinders are of the "Open-Door" disc type and are capable of very fine work, producing products as fine as 100 mesh (coarser if desired) when working on dry, friable, soft or moderately hard materials. Simply turn hand wheel to provide product regulation from 10 to 100 mesh.

The only sure way to maintain strict quality of products is laboratory control . . . and that calls for accurate sampling.

Sturtevant Laboratory Equipment meets the exacting requirements of laboratory work. They are fast and accurate . . . provide true samples.

Rugged and dependable, Sturtevant equipment actually has all the features of full size machines plus extra accuracy and wider range of adjustment. The "Open-Door" accessibility permits quick, thorough cleaning . . . prevents the possibility of previous batches from contaminating new samples.

Investigate Sturtevant equipment for your laboratory. It will cut your sampling costs . . . help maintain strict quality of products . . . increase sales. Write for complete details and catalog.

STURTEVANT MILL COMPANY
106 CLAYTON STREET, BOSTON 22, MASS.

Designers and Manufacturers of: CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

When they smack their lips
and say "UMM! GOOD! VERY!"
It's usually made with **NORDA CHERRY**

Norda Cherry Flavor really makes things taste good.

Use Norda Cherry to make products that people will buy and keep on buying. Norda Cherry is rich and delicious. It has the real-cherry goodness of freshly picked, sun-fattened fruit. It's a great favorite.

Make your gelatins, syrups, mixings, frostings, candies with genuine or fine imitation Norda Cherry. Its true cherry taste will improve them and make more people want more of them.

Test Norda Cherry now by getting your *free samples*. Ask for the new Flavor Catalogue, too. Send today!

Norda Cherry
Another "Favorite to Flavor It"

Norda ESSENTIAL OIL AND CHEMICAL COMPANY, INC.

601 West 26th Street, New York 1, N. Y.

CHICAGO • LOS ANGELES • ST. PAUL • MONTREAL • TORONTO • HAVANA • MEXICO CITY • LONDON • PARIS

Check with Continental

- ✓ Check the dependability of supply that Continental assures users of cans.
- ✓ Check Continental's speed of delivery.
- ✓ Check Continental's service — service that may save you money by suggesting improvements in your present packaging operations.
- ✓ Check Continental's record on research and product development.
- ✓ "Check with Continental" *before* making any decision affecting your supply of cans. It costs nothing, may mean much!

CHECK-LIST FOR MEAT PACKERS!

Continental supplies round, oblong and irregular shaped meat cans in a variety of sizes, both key-opening and non-key-opening . . . for example — pear-shaped cans for hams, 12 oz. and six pound cans for luncheon meats, and the familiar round cans for special stews and ready-to-serve recipes.

You can't beat Continental as a dependable source of supply

CONTINENTAL CAN COMPANY

100 EAST 42nd STREET, NEW YORK 17, N. Y.

GENUINE

JEFFREY

REPLACEMENT

PARTS

Most standard Jeffrey parts are available when replacement becomes necessary. What's more, they are exact duplicates of original equipment except where Jeffrey improvements from time to time have made them even better. To prevent costly shut-downs and insure longer wear, insist on Jeffrey Replacement Parts.

THE JEFFREY MANUFACTURING COMPANY

927 North Fourth St., Columbus 16, Ohio

ESTABLISHED 1877

Complete Line of Material Handling, Processing and Mining Equipment

Largest Selling . . . Lowest Costing

CHEVROLET ADVANCE-DESIGN TRUCKS

Lead Them All!

CHEVROLET You'll discover a new kind of value when you drive and ride in these Advance-Design Chevrolet trucks. You'll find fleetness and flexibility, power and massive strength and long-lasting quality in every feature of body, frame, cab and chassis. Yet, you enjoy all these premiums *at lowest cost*, for Chevrolet trucks have 3-WAY THRIFT—low-cost operation, low-cost upkeep and the *lowest list prices in the entire truck field!*

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICHIGAN

The leader offers all these features

Chevrolet's 4-SPEED SYNCHRO-MESH TRANSMISSION offers quicker, quieter and easier operation in Series 3800 and heavier duty trucks. Faster shifting maintains speed and momentum on grades.

Chevrolet trucks have the famous CAB THAT "BREATHES"*! Outside air is drawn in and used air forced out! Heated in cold weather.

Chevrolet's power-packed VALVE-IN-HEAD ENGINE provides improved durability and efficiency as well as the world's greatest economy for its size!

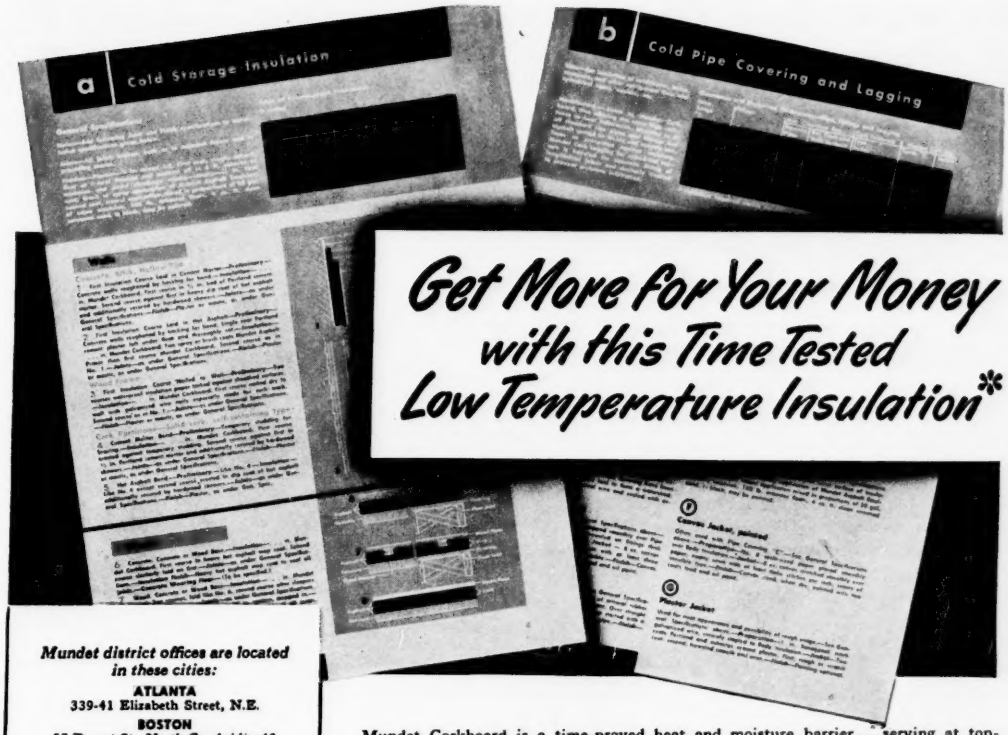
Chevrolet Advance-Design brings you the FLEXI-MOUNTED CAB, cushioned on rubber against road shocks, torsion and vibration.

Chevrolet's exclusive SPLINED REAR AXLE HUB CONNECTION adds greater strength and durability to heavy-duty models.

Uniweld, All-Steel Cab Construction • Large, Durable, Fully-Adjustable Seat • All-Round Visibility with Rear-Corner Windows* • Heavier Springs • Super-Strength Frames • Full-floating Hypoid Rear Axles on the 3600 Series and Heavier Duty Models • Specially Designed Brakes • Hydrovac Power Brakes on Series 5000 and 6000 Models • Standard Cab-to-Axle Length Dimensions • Multiple Color Options.

**Heating and ventilating system and rear-corner windows with de luxe equipment optional at extra cost.*

CHOOSE CHEVROLET TRUCKS FOR TRANSPORTATION UNLIMITED!



Get More for Your Money with this Time Tested Low Temperature Insulation*

Mundet Corkboard is a time-proved heat and moisture barrier . . . serving at top-efficiency in hundreds of quick freezing and frozen food locker plants, in cold storage rooms and food processing plants. Whether you have small or large facilities for low temperature, you need Mundet Corkboard for these dollar-saving advantages:

LOW CONDUCTIVITY Mundet Corkboard provides the most efficient barrier to heat transfer due to its internal cellular structure of sealed dead-air spaces.

STRUCTURAL STABILITY The cellular structure of Mundet Corkboard maintains its shape and characteristics under rigorous conditions of service.

NON-ABSORBENCE Mundet Corkboard has no capillary attraction. This nature-made quality avoids absorption of dampness and odors. There is no swelling or loss of insulating value from moisture infiltration.

EASE OF INSTALLATION Mundet Corkboard is light in weight despite its strength. It cuts easily, readily holds nails or skewers; bonds with cement, asphalt or paint.

LONG-LIFE There is only one way to figure insulation cost. That is the over-all 'life-expectancy' of the material. Here, again, Corkboard is the choice, with thousands of installations to prove its durable service.

The best insulation requires competent installation. You benefit from the experienced erecting services that are offered by Mundet branch offices. Corkboard is available for prompt shipment from nearby warehouses. Send coupon for copy of Mundet Cork Manual. Prepared in convenient filing size, with cork specification data.

F5

MUNDET CORK CORPORATION
Insulation Division
7101 Tonnelle Ave., North Bergen, N. J.

* *Please send copy of Mundet Cork Insulation Catalog in handy reference size.*

Name.....

Company.....

Address.....

City.....*Zone*.....*State*.....

Mundet district offices are located in these cities:

ATLANTA
339-41 Elizabeth Street, N.E.

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57 Regent St., North Cambridge 40

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206 E. Stonewall St.

CHICAGO 16
2601 Cottage Grove Avenue

CINCINNATI 2
427 West 4th Street

DALLAS 10
601 Second Ave.

DETROIT 21
14401 Prairie Street

HOUSTON 1
Commerce and Palmer Streets

INDIANAPOLIS
15 E. Washington St.

JACKSONVILLE 6, FLA.
800 E. Bay St.

KANSAS CITY 7, MO.
1428 St. Louis Avenue

LOS ANGELES
(Maywood)
6116 Walker Avenue

NEW ORLEANS 16
315-25 N. Front Street

PHILADELPHIA 39
856 N. 48th Street

ST. LOUIS 4
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SAN FRANCISCO 7
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Write us for name of our nearest representative if there is no Mundet office in your city.

MUNDET
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Be smart about your business . . . demand uniforms of

REEVES QUALITY FABRICS

Beyond compare for smart good looks and longer wear, Reeves Fabrics have what it takes to stand up under the punishment of repeated launderings . . . and still look fresh and crisp. For these Reeves Fabrics are made from carefully selected long-staple cotton . . . combed . . . Sanforized* . . . and vat-dyed in colors that are fast to sun, water and perspiration.

You benefit three ways. Smart looking uniforms boost employee morale... increase customer good will. Longer-wearing uniforms mean greater savings because they spread first costs.

Look for the Reeves Fabric Label – it's your sign of uniforms and work clothes that "mean business." Write today for complete information concerning your industry.

**Residual shrinkage less than 1%*

"FROM COTTON TO CUTTER"

REEVES BROTHERS, INC.

54 WORTH STREET, NEW YORK 13, N. Y.

REPRESENTATIVES IN: *Akron • Atlanta • Boston • Chicago • Dallas • Los Angeles • Philadelphia • Portland, Oregon • St. Louis • Montreal • Toronto*

Cuts Pump Upkeep

COST DOWN MORE THAN HALF IN 4 YEARS SERVICE AT MICH. CITY PLANT

SAYS A. C. LOHSE, General Power Engineer, Pullman-Standard Car Manufacturing Company — "Maintenance costs on our old pump were sky-high, so in March, 1945, we installed this *Electrifugal* pump to move condensate from our compressors and hydraulic pumps. It has run 16 hours a day, five days a week with only routine maintenance and one repacking. Cost per gallon is less than half what it was and performance is much more dependable."

This is the kind of dependable, cost-lowering service you can get from *Electrifugal* pumps. Motor and pump are mounted on *one* shaft in *one solid frame* for maximum rigidity. Feet are wide spread for firm support. Bronze ring protects casing from wear by impeller and is easily replaced when required.

Every *Electrifugal* pump is tested at the factory. Performance is guaranteed.

Allis-Chalmers makes hundreds of pumps for many types of service. For full information, see your A-C Authorized Dealer or District Office, or write for Bulletin 52B6059E. Also in Sweet's. A 2640

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Sold . . .
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by Allis-Chalmers Authorized Dealers, Certified Service Shops and District Offices throughout the country.

MOTORS — ½ to 25,000 HP and up. Matching Allis-Chalmers Control.

TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

Electrifugal, Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

From these strategically-located Betner Bag plants comes a complete food packaging service for all the U.S.A.

Pinpointed for service to food processors everywhere . . . that's the big idea behind the locating of these Betner Better Bag plants. Where do you have your business? What kind of bag do you need for your product? Betner has it . . . and can get it to you quickly.

Backing up our idea of what a complete bag service should be is a widely-flung sales organization, one or more members of which are near you. Betner Bags are, in effect, as close to you as your classified directory.

Be sure to visit Booth 506 at the AMA Packaging Exposition to see how Betner's Better Bags Build Business

Your product will GO safely in one of these types of bag

Coffee
Flour
Sugar
Potato chip
Prepared mix
Gelatin dessert
Specialties
And Many Others

Betner bags are "proofed" against . . .

moisture-vapor
grease
insects
water
sifting

Many Betner bags are THERMOSEAL*-ed

This is our patented, heat-sealed closure which gives up to 20% greater protection.

*Trade Mark Reg. U. S. Pat. Off.

Benj C Betner Co DEVON, PA.

CAMP BETNER CORP., Richmond, Va.; BENJ. C. BETNER CO. of WISCONSIN, Appleton, Wisconsin; SOUTHERN PACKAGING CORPORATION, Affiliate of Benj. C. Betner Co., High Point, N.C.; BENJ. C. BETNER CO., Paris, Texas; BENJ. C. BETNER CO. of CALIFORNIA, Los Angeles, California.

A complete bag service—from idea to finished bag to machinery for closing coffee bags and filling and closing liner bags for cartons.

How TIMKEN® bearings get under a potato's skin

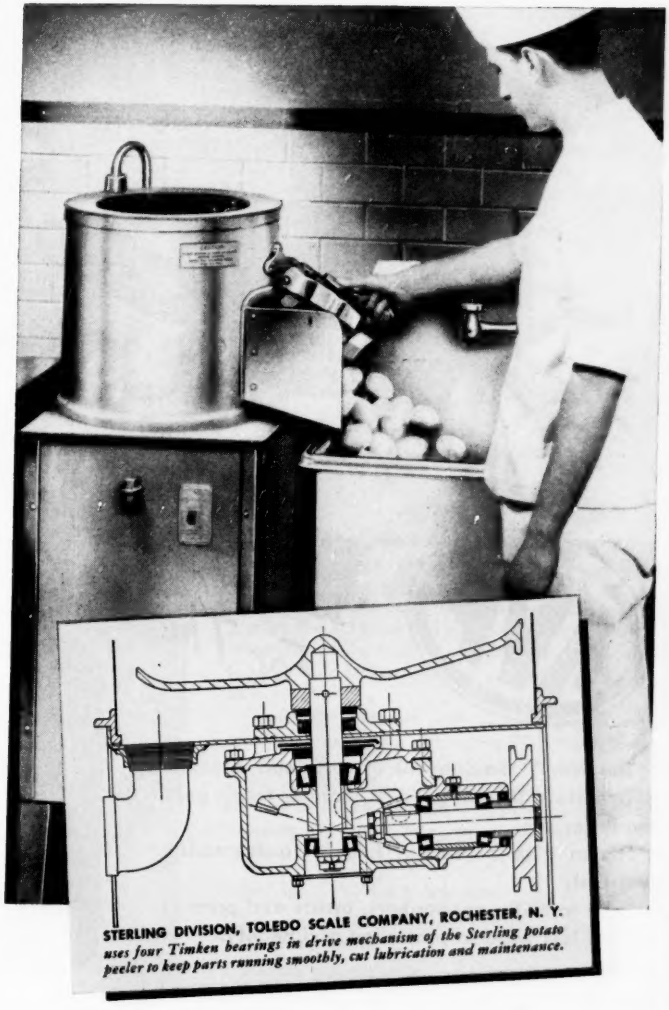
TIMKEN® bearings may not seem like the business end of a potato peeler—but they actually have a lot to do with rubbing the skin off a spud. Used in the drive mechanism of Sterling potato peelers, they keep shafts running smoothly, gears meshing correctly, and assure trouble-free operation. Maintenance and lubrication are pared to a minimum.

The true rolling motion of Timken tapered roller bearings and the incredibly smooth surface finish of the rolls and races enable them to operate freely and without friction. Due to the line contact between rolls and races, Timken bearings have tremendous load carrying capacity. The tapered construction of the rolls permits Timken bearings to carry any combination of radial and thrust loads.

Timken bearings normally last the life of the machine. They are made of the finest steel ever developed for tapered roller bearings—Timken fine alloy steel.

Be sure Timken tapered roller bearings are used wherever ease of maintenance and lubrication is important in the machines you buy or build. Look for the trademark "Timken" every time. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



STERLING DIVISION, TOLEDO SCALE COMPANY, ROCHESTER, N. Y. *uses four Timken bearings in drive mechanism of the Sterling potato peeler to keep parts running smoothly, cut lubrication and maintenance.*

NEW TIMKEN BEARING CUTS RUN-OUT IN HALF!

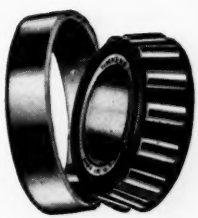
Until now, the Timken "Zero" bearing has been the last word in bearing accuracy. Now Timken offers industry the "Double-Zero" bearing—*twice as accurate* as the "Zero"! Maximum run-out of the new "Double-Zero" bearing is only 75 millionths of an inch—*half* the 150 millionths run-out of the "Zero" bearing.

What an opportunity for manufacturers of machines where extreme accuracy is essential! Available in standard single row types, up to 10" O.D. Write for further information.

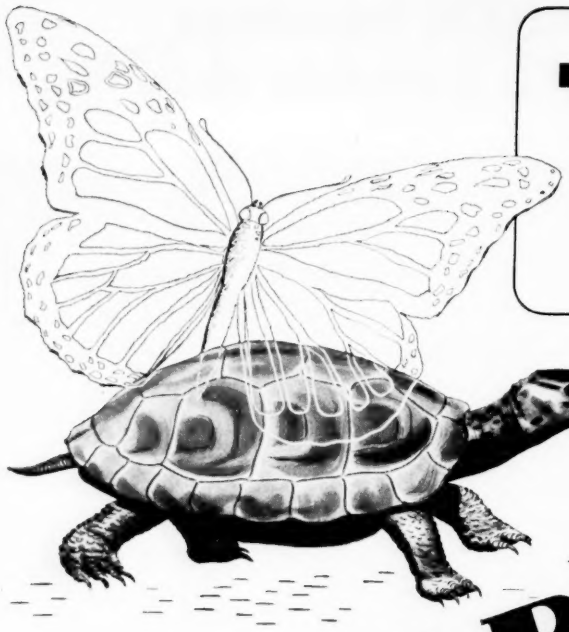
TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION →✳←



PROTECTION AND Beauty

KVP PAPERS For The FOOD INDUSTRY

The No. 1 requirement of any food paper is protection. It must keep its contents fresh until ready for use.

It can also be beautiful, for quick sales appeal.

Look to KVP papermakers, artists and printers for the last word in protection and beauty.

INDUSTRIES SERVED

BAKING
Bread - Cracker
Cereal

MEAT
Packing - Locker
Retail

DAIRY
Butter - Cream - Cheese
Ice Cream - Milk

FISH - FRUIT - FROZEN FOODS
POULTRY - SHORTENING
VEGETABLE

* The giant tortoise from the Galapagos Islands owes his long life to the protection of his great horny shell.

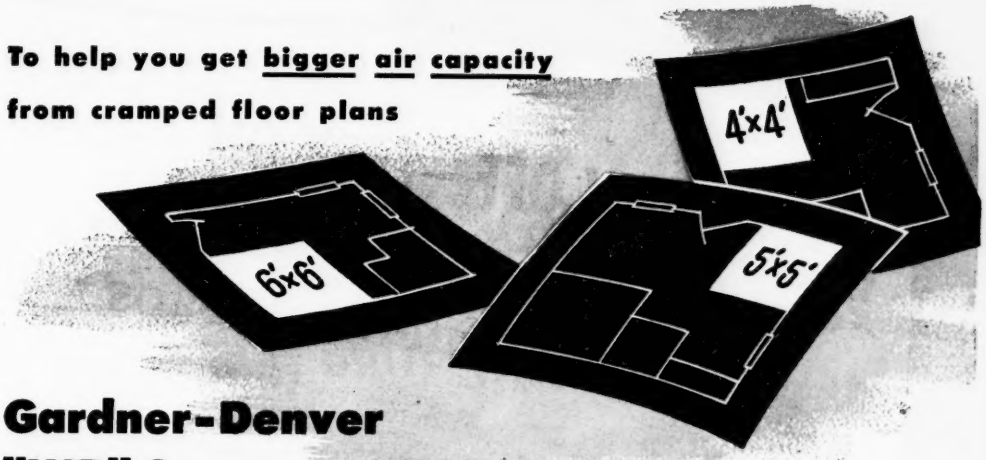
** This beautiful butterfly, Anosia-Plexippus, is a native of North America.

Kalamazoo Vegetable Parchment Company

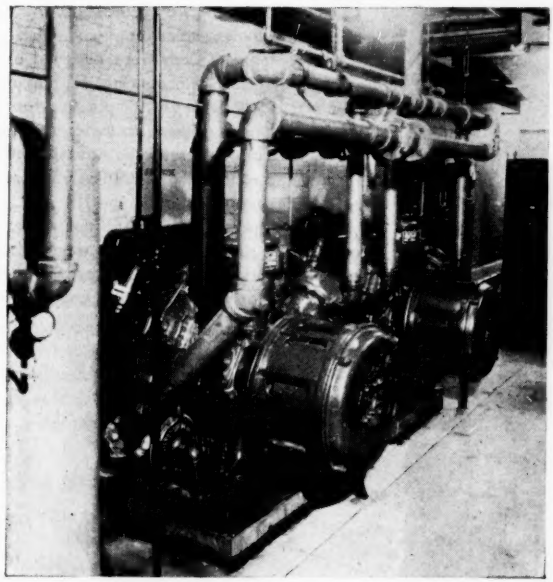
PARCHMENT · MICHIGAN

ASSOCIATED COMPANIES: KALAMAZOO VEGETABLE PARCHMENT CO., DEVON, PENNA.
KVP COMPANY OF TEXAS, HOUSTON, TEXAS
HARVEY PAPER PRODUCTS CO., STURGIS, MICHIGAN
IN CANADA: THE KVP COMPANY LIMITED, ESPANOLA, ONTARIO
APPLEFORD PAPER PRODUCTS LIMITED, HAMILTON, ONTARIO · MONTREAL, QUEBEC

To help you get bigger air capacity from cramped floor plans



Gardner-Denver "WB" Compressors are made in 7 sizes!



Compact Gardner-Denver "WB" Two-Stage, Vertical Water-Cooled Compressors, with built-in motors.

Here's how you can have *greater air capacity* — even though floor plans are crowded! Install a Gardner-Denver "WB" — the vertical, two-stage compressor that's built in seven space-saving capacities from 142 to 686 cubic feet displacement per minute. The smallest size fits into a four-foot square — the largest requires only about six feet each way.

Compactly designed with integral motor and self-contained cooling system, the "WB" rates high in efficiency. Completely water-jacketed cylinders and heads, plus balanced construction — two low pressure cylinders for each high pressure cylinder — assure low power costs and an air supply you can always count on.

Other big "WB" advantages:

- ★ Duo-Plate "air-cushioned" valves — quiet, simple and durable.
- ★ Timken tapered roller main bearings.
- ★ Force-feed lubrication system.
- ★ Furnished with built-in motor — or with sheave for "V"-belt drive.

For complete information, write Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER SINCE 1859

EASY OFF—EASY ON FOR MORE REPEAT SALES...

Anchor Amerseal* Caps

EASY access to contents encourages more frequent use of the product by housewives. This, in turn, means more repeat sales for you.

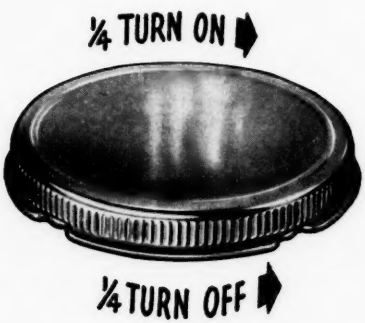
Anchor Amerseal Caps were designed and developed with feminine fingers in mind. They remove and reseal with an easy, simple quarter-turn—won't stick, gum or freeze to the container finish.

Not only are *Amerseals* the easiest closures to remove and reclose, they reseal as effectively the hundredth time as the first.

Anchor Amerseal's lug construction makes these advantages possible . . . help women to more easily use and more fully enjoy your fine products.

Write us for more information and samples for test purposes.

*Trade-Mark



ANCHOR HOCKING
GLASS CORPORATION
Lancaster, Ohio

FEEDING THROUGH STARS...

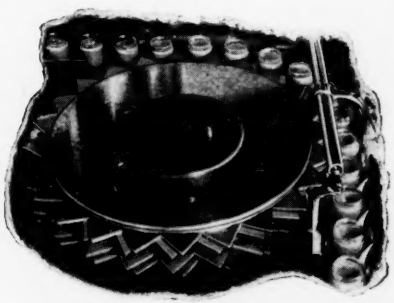
It's tough, uniform Anchorglass*

HELICOIDS and star wheels synchronize and time glass containers for the following station in production without deviation and at seemingly incredible speeds. It takes strong, tough, uniform bodied containers here to keep production flowing on a smooth, even keel.

Anchorglass containers have a background of such proven performance. Practical engineered designs—consistency in manufacture—accurate temperature controls in annealing—strict quality control—a constant emphasis on highest manufacturing standards—all contribute to the high level, dependable performance of *Anchorglass*.

Anchorglass containers are available in all standard styles, capacities and finishes, in crystal, amber and emerald green glass. Samples for comparative or test purposes gladly supplied on request.

*Reg. U. S. Pat. Off.



ANCHOR HOCKING
GLASS CORPORATION
Lancaster, Ohio

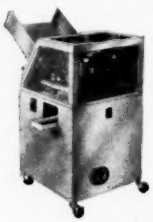
These well-known products are packaged at lower cost with General Mills Machines

Looking for faster, cheaper packaging for your product? Take a tip from some of the nation's top manufacturers—investigate the cost-cutting results offered by General Mills' line of specialized equipment.

TRAY-LOCK MACHINE

Forms lock-type trays and cartons from unglued blanks

FINISHED-EDGE CARTON FORMER



Sets up open-top double-wall trays and cartons

Completely automatic, these machines deliver ready-to-fill trays and cartons at speeds up to 90 per minute. Both units produce a wide variety of tray and carton sizes and styles, all neatly squared with sturdy, straight sides. Either machine plugs into regular 110-volt outlets.

SEND COUPON FOR COMPLETE DETAILS ON ANY OF THESE MACHINES

VACUFLOW POWDER FILLERS

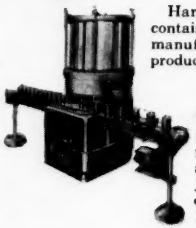
Use a new precision method of *drawing* powdered products into containers by means of an intermittent vacuum. This permits complete control over weight and density of powders.

MODEL E

Fills bulk containers up to 200 pounds. Operator positions containers; machine fills them to precise weights automatically.

MODEL D

Handles small and medium-size containers fed manually. Ideal for manufacturers with low tonnage production on a range of products.



ROTARY MODEL

Fills up to 300 containers a minute automatically. Handles a wide variety of sizes of cans, jars, small-mouth bottles and cartons. Available with 8, 12, 16, or 24 filling heads.

MADE BY ONE OF THE WORLD'S LARGEST USERS OF PACKAGING MACHINERY

General Mills, Inc., Dept. F 59
1620 Central Ave., Minneapolis 13, Minn.

Please send complete information regarding ☐ Tray-Lock Machine ☐ Finished-Edge Carton Former ☐ Vacuflow Powder Filler Model E ☐ Model D ☐ Rotary Model ☐ Have representative call.

NAME_____

POSITION_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

MEET US AT BOOTH 501, ATLANTIC CITY PACKAGING EXPOSITION MAY 10-13

"Always a Flow of Lubricant" is One Reason for Long Life and Low Maintenance Cost of

EATON

2-Speed Truck

AXLES

Positive lubrication of all vital parts—even at slowest speeds where gear-tooth loads are often highest—is an important factor in the outstanding long-life and low-maintenance cost record of Eaton 2-Speed Axles. In less than one revolution of the bevel gear, oil begins to flow to all moving parts, and the supply is automatically adjusted to meet the demands of operating speed. This abundant lubrication of all gears and bearings reduces friction and wear with consequent longer axle life and lower upkeep cost. Eaton 2-Speed Axles are available for most trucks of the 1½-ton class and larger. See your truck dealer for complete information.

More Than a Million Eaton 2-Speed Axles in Trucks Today

Axle Division

EATON MANUFACTURING COMPANY

CLEVELAND, OHIO

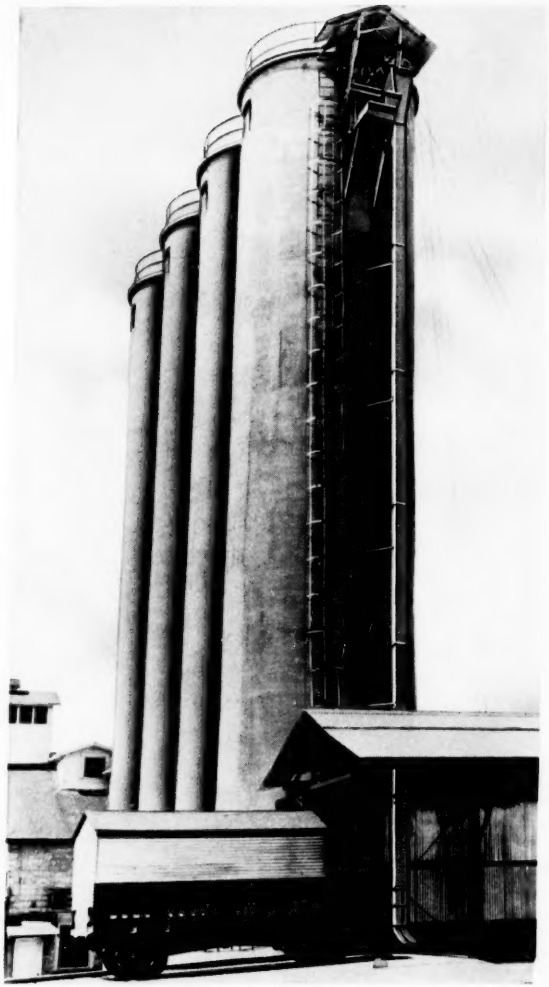
MANY FOOD PROCESSORS

COULD USE A

CONVEYOR SYSTEM

THAT'S

Working for Peanuts



"Keep them clean" . . . "Move them fast" . . . "Move them gently"! Those are the rules that must be followed for bulk handling of food products.

For these job specifications, Stephens-Adamson engineers had a ready answer. Out of the S-A Line including every type of bulk materials handling equipment they recommended a Redler Conveyor. A Redler System was installed. Its enclosed casings, compact, light-weight installation and low maintenance cost have amply satisfied every requirement.

To improve your bulk materials handling system or add new units, let these men co-operate. Problem-solving for *you* is *our* business. Write us!

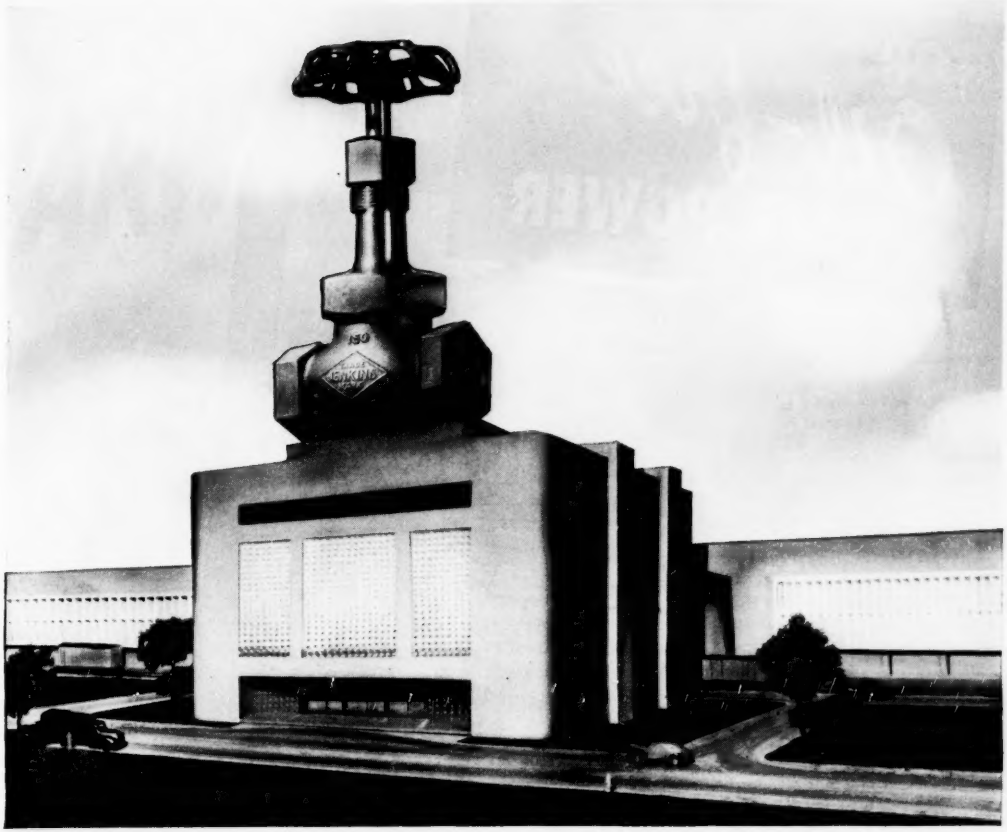
Cinderella Foods Company
Dawson, Georgia

Enclosed trucks deliver shelled peanuts to four receiving hoppers at sheltered loading platform. Horizontal length of REDLER Conveyor-Elevator in shallow trough loads from hoppers and curves into elevating run 78 feet up the side of the nearest silo. Product is then transferred to a 64-foot long horizontal REDLER Conveyor extending through rooms at the top of the silos. This enclosed conveyor discharges to any of the four silos. The REDLER conveying and elevating system was designed to handle 22 tons per hour at about 44 feet per minute.

STEPHENS-ADAMSON MFG. CO.

6 Ridgeway Avenue, Aurora, Illinois · Los Angeles, Calif. · Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT



There's Truth in this "Tall Story"

IF YOU THINK of *all valves* in this plant as *one valve*, you'll see the truth in this trick photo. Valves, collectively, represent one of the biggest investments in equipment in any plant.

That's why, with wages and material costs higher than ever before, it is just as important to keep a sharp eye on valve maintenance as it is on operating costs of larger plant units.

EXCESSIVE MAINTENANCE of one inferior valve is insignificant, but, multiplied by thousands, it becomes a serious drain on operating budgets.

JENKINS BROS. helps you meet this problem two ways. First, by building extra endurance into Jenkins Valves, making them the longest-lasting, lowest-upkeep valves that money can buy. Second, with advice from Jenkins Engineers on any question of proper selection, installation, or maintenance.

For all new installations, for all replacements, rely on Jenkins quality and engineering service for lowest valve costs in the long run. *Sold through leading Industrial Distributors everywhere.*

Jenkins Bros., 80 White St., New York 13; Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago; San Francisco. Jenkins Bros., Ltd., Montreal.

"PREVENT VALVE FAILURE" is a 28-page guide to valve economy, fully illustrated, with case histories of valve damage, and recommendations for its prevention by proper selection, installation, inspection, and maintenance. FREE on request. Write JENKINS BROS., 80 White St., New York 13, N. Y.

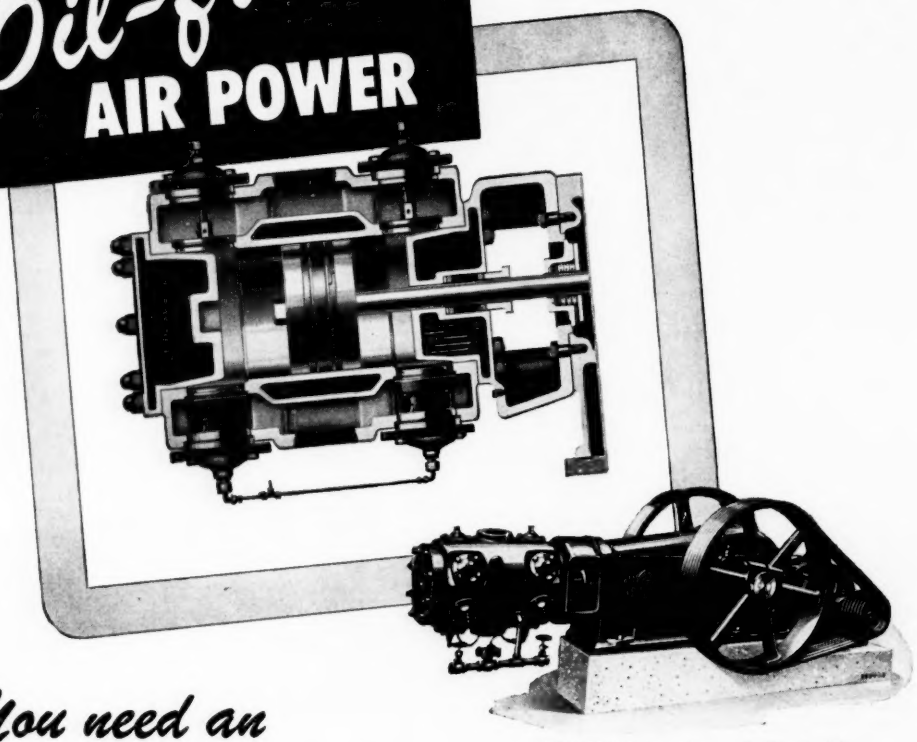
LOOK FOR THIS DIAMOND MARK

SINCE 1864

JENKINS VALVES

Types, Sizes, Pressures, Metals for Every Need

FOR *Oil-free* AIR POWER



This ES-NL Compressor is fitted with a non-lubricated cylinder like that shown in the cross-section above.

You need an N-L COMPRESSOR

For conditions where air comes in direct contact with foods, chemicals, products, or processes that must not be contaminated by any trace of lubricant . . . or for instrument-control systems . . . or for spraying enamels . . . buy Ingersoll-Rand heavy-duty compressors equipped with NL (non-lubricated) cylinders.

The piston of a *non-lubricated* cylinder has graphitic-carbon wearing rings and pressure rings which prevent metallic contact. No lubricant is needed in the cylinder.

NL cylinders are available for Ingersoll-Rand single- and multi-stage heavy-duty compressors . . . for belt, electric, steam, diesel, or gas drive.

If you need *oil-free* compressed air, let an Ingersoll-Rand engineer tell you more about this modern machine.

I-984

Ingersoll-Rand

11 Broadway, New York 4, N. Y.

COMPRESSORS · AIR TOOLS · ROCK DRILLS · TURBO BLOWERS · CONDENSERS · CENTRIFUGAL PUMPS · OIL AND GAS ENGINES

YARWAYS make it hot for "CHILI"

Marlo Packing Corporation, San Francisco, specialize in making delicious chili con carne . . . and they rely on Yarway Impulse Steam Traps on cooking kettles to get that chili hot!

Getting equipment hotter, sooner—and keeping it hot—is the job Yarway Impulse Traps specialize in wherever steam traps are used.

When steam is turned on, Yarways open wide and discharge condensate continuously so that operating temperature is quickly reached. Then, under lighter condensate loads, Yarways discharge at short intervals to *keep* equipment at peak efficiency. Other Yarway features—small size, easy installation, straight through piping, low maintenance, only one moving part, low price.

Call your nearest Mill Supply dealer for Yarway Impulse Steam Traps and Yarway Strainers today.

FREE TRAP BULLETIN T-1739 ON REQUEST

YARNALL-WARING COMPANY
127 Mermaid Ave., Philadelphia 18, Pa.

Yarway Traps and Strainers on cooking kettles at Marlo Packing Corp.

YARWAY IMPULSE STEAM TRAP

Take a WALWORTH No. 225P Bronze Valve Apart...

COMPARE IT PIECE BY PIECE

It will pay you to look inside the Walworth No. 225P. Compare the improved design, construction and convenience features shown in the "exploded" view. Notice the husky bronze body, the removable seat and disc, the oversize stem, all assuring maximum protection against wear and leakage.

Further, No. 225P is the TOUGHEST bronze valve your money can buy. The stainless steel, noncorrosive seats and discs are heat treated to a hardness of 500 Brinell — hard enough to scratch glass and crush nails. For this reason, the valve can be closed on sand, slag, scale and similar flotage without injury to the seating surfaces, and "wire drawing" is practically eliminated. Thus years of tight, positive shut-off are assured.

Available in both globe and angle types (angle type: No. 227P) in sizes ¼" to 2", this quality valve is recommended for 350 lbs. W.S.P. at 550 F, and 1000 lbs. non-shock service on cold water, oil, gas or air.

For full data on this long-life, economical Walworth Bronze Valve, see your local Walworth distributor, or write for Circular 82.

WALWORTH

valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

HERE'S a

PINEAPPLE FLAVOR

with tremendously improved technical characteristics

AND

with the full, fresh note of fruit just off the bush.

Firmenich Pineapple is the pungent, completely authentic taste and smell of ripe pineapple sliced in the field. At the same time it has the remarkable lasting power and high stability possible in precisely designed synthetics. Its effectiveness when processed at high temperatures is particularly valuable.

For samples write to: Dept. A, FIRMENICH & CO., 250 WEST 18 STREET, NEW YORK 11, N. Y.

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CHICAGO OFFICE: 612 NORTH MICHIGAN AVENUE
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GENEVA, SWITZERLAND . . . PARIS, FRANCE

WISSCO BELTS' *Open Mesh* CONSTRUCTION

Permits

FREE AIR CIRCULATION FOR

Annealing • Baking • Brazing • Cooling • Drying

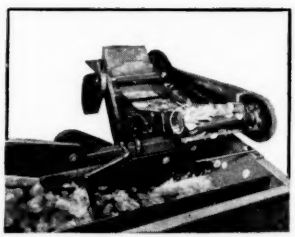
FREE DRAINAGE FOR

Blanching • Degreasing • Frying • Quenching • Washing

EACH WISSCO BELT is custom-engineered for the job it is designed to perform—to operate efficiently at temperatures ranging from -40°F. to 2100°F., or to withstand corrosion, abrasion and other destructive factors.

Each Wissco Belt has in it the skill and experience that comes with 50 years of pioneering in belt development, design and application.

Learn how Wissco Belts can help you cut costs, insure faster production and more uniform quality. Send today for our illustrated catalog showing types and advantages of numerous conveyor belt constructions.



Typical of innumerable food processing operations Wissco chain-driven, stainless steel belts carry potato chips through washing, frying and draining operations with a minimum of manual attention.

WISSCO METAL CONVEYOR BELTS

A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

CF&I

Belt Sales Office and Plant—56 Sterling St., Clinton, Mass. • *Executive Office*—500 Fifth Avenue, New York 18, N. Y.

Sales Offices—Boston, Buffalo, Chattanooga, Chicago, Denver, New York • *Pacific Coast Subsidiary*—The California Wire Cloth Corp., Oakland 6, Cal.

Why you should know more—now—about Ac'cent®

the startling new development in MSG

Ac'cent is beyond doubt one of the most unusual and promising items in the food world today.

Much has been written about it, many have tried it, more every week are beginning to use it. Its effect in improving and *sustaining* flavor in foods is little short of amazing. Even at this early stage, the possibilities that can be seen in Ac'cent are great enough to merit, we believe, the serious attention of all food processors.

Ac'cent is a 99+% pure MSG . . . mono sodium glutamate. It is not a flavoring, not a condiment. It adds no flavor, no aroma, no color of its own. The action of Ac'cent is to bring out, intensify the natural *flavor of food itself. By doing so, it is wonderfully effective in overcoming the usual flavor-loss suffered in processing.*

Ac'cent is an unblended *MSG. Thus in itself and in its effect on foods, Ac'cent is unlike many compounded glutamates which you may have known about and even tried in the past. In Ac'cent you get the maximum benefit of this vegetable protein derivative.*

We invite you to judge for yourself what Ac'cent can do to enhance and strengthen flavors in one or more of your foods. Members of our staff of food technologists and chefs are available on call to consult with you in your plant, explain the use and effect of Ac'cent, and supervise tests of it in your products. *Send for information we have on your product.*

You be the judge . . . but prepare to be surprised!

In 200 lb. drums

A TYPICAL TEST OF AC'CENT —IN FROZEN PEAS—

Take two packages of frozen peas from the same lot. Allow to thaw or partially thaw in the usual manner, then drop them into separate saucepans containing the required amount of boiling water. Immediately, add to one saucepan ½ teaspoon of Ac'cent and continue to cook both in the regular manner. When done, taste the difference. Note the fullness, the freshness of flavor in the one containing Ac'cent.

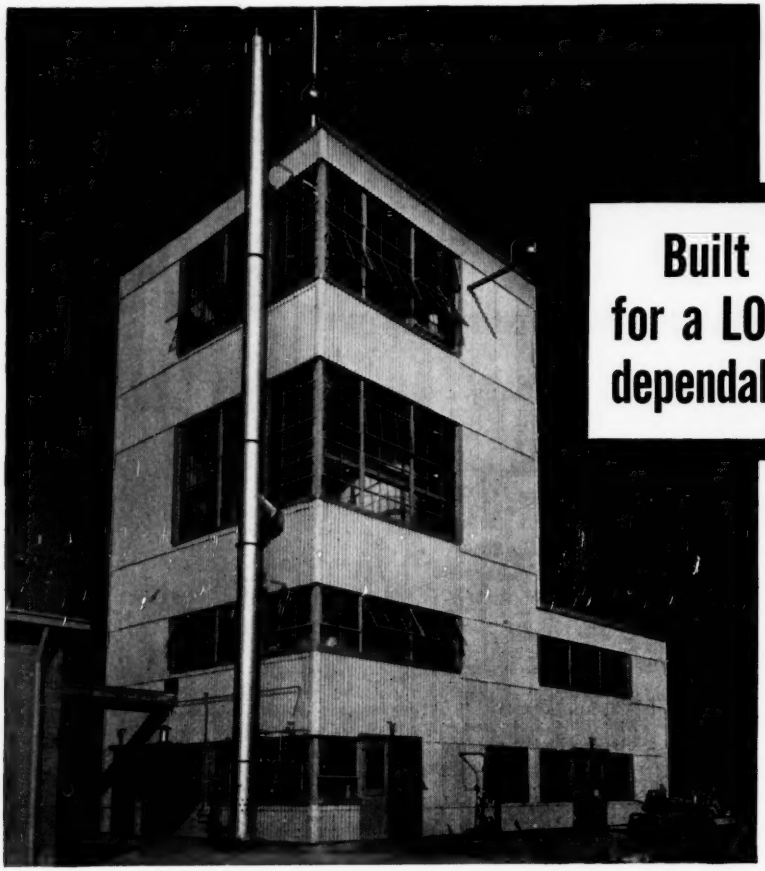
Write **Amino Products Division—Dept. FI-4.**
International Minerals & Chemical Corp.
General Offices: 20 North Wacker Drive
Chicago 6, Illinois

Ac'cent makes food flavors sing

Printed in U.S.A.

Trade Mark "Ac'cent" Reg. U.S. Pat. Off.

• *New pilot plant of Pittsburgh Consolidation Coal Company at Library, Pa., sided with "Century" Asbestos Corrugated. Construction by Chemical Plants Division of Blaw-Knox Company, Contractors.*



Built for a LONG life of dependable service

K&M "Century" ASBESTOS CORRUGATED

Nature made Asbestos...
Keasbey & Mattison has made it serve mankind since 1873

This large pilot plant of the Pittsburgh Consolidation Coal Company is the latest unit in one of the most modern research laboratories of its kind. The new building is designed and equipped for the study and development of more efficient coal gasification processes.

It is fitting that the fine equipment of this pilot plant should be housed in a modern building sided with good-looking, long-lasting K&M "Century" Asbestos Corrugated. This time-proved material is noted for great structural strength and ability to withstand severe commercial usage. It resists fire, weather, rot, rust and galvanic action. And no protective painting or upkeep is needed.

"Century" Asbestos Corrugated is easy to cut with a portable electric or band saw . . . easy to drill . . . easy and *fast* to apply, for it comes in 24 different sheet lengths. Can be re-used even after many years of service.

Write for name of nearest distributor and further particulars. Your inquiry will receive prompt attention.

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

WHY SHOP FOR A BOILER??

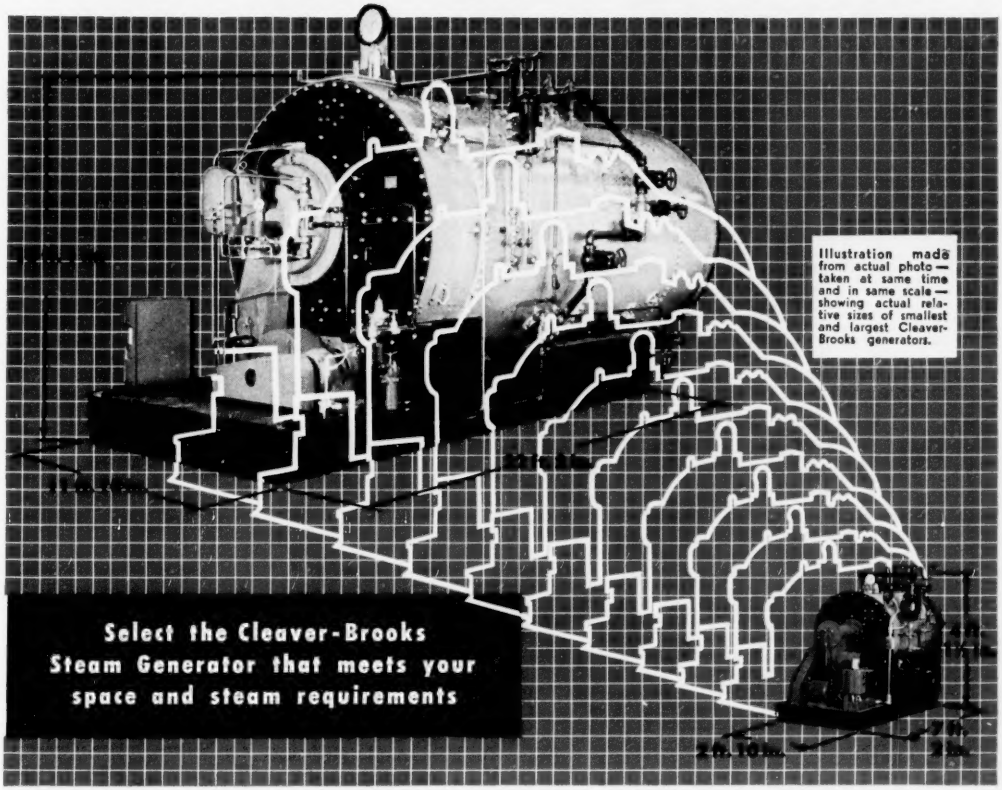


Illustration made from actual photo — taken at same time and in same scale — showing actual relative sizes of smallest and largest Cleaver-Brooks generators.
Select the Cleaver-Brooks Steam Generator that meets your space and steam requirements

WHY search and shop for a boiler — install a Cleaver-Brooks engineered and packaged steam generator that fully meets your steam requirements and needs only a minimum of space and headroom.

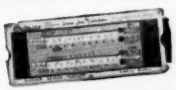
You can select from a range of sizes 15 to 500 hp. — and you can have your Cleaver-Brooks steam generator equipped for oil, gas, or with a combination burner which permits alternate use of gas or oil and provides for a quick change-over from one fuel to the other.

Equally important — you get Cleaver-Brooks guarantee of at least 80% efficiency from full load down to 30% of rating — with either gas or oil as fuel — and IN ALL SIZES.

Cleaver-Brooks steam generators enable you to burn the available fuel in your area — give you clean, smokeless operation—eliminate fuel and ash handling — need no high or costly stacks — no special foundations — fit under low headroom and into limited space — provide flexible operation to meet fluctuating loads — fully meet all codes.

Oil or Gas Fired . . . Guaranteed 80% Efficiency from Full Load Down to 30% of Rating . . . IN ALL SIZES

Available in a size to fit your needs — 15 to 200 p.s.i., 15 to 500 hp.—write for Cleaver-Brooks Steam Generator bulletin.



CLEAVER-BROOKS COMPANY, 352 E. Keefe Ave., Milwaukee 12, Wis.

WRITE on your business letterhead for Free Steam Cost Calculator — a ready reference slide rule showing the comparative steam costs when using oil, gas or coal as fuel.

Cleaver-Brooks

"Packaged" STEAM GENERATORS

HAVE SERVED INDUSTRY FOR MORE THAN FIFTEEN YEARS

Millions of Women

CHEER

The ENRICHMENT PROGRAM

AMERICAN homemakers have saluted and endorsed the food industry's program of enrichment. For they know well the importance of adequate vitamins in their daily meals, and their endorsement takes the form of choosing *enriched* foods for their family tables.

When you enrich with Merck enrichment products you *know* that the faith of those millions of women is fully protected. Merck enrichment products come from the same plant that pioneered in the research and large-scale production of thiamine, riboflavin, niacin, and other important vitamins. MERCK *KNOWS* VITAMINS.

MERCK VITAMIN PRODUCTS FOR ENRICHMENT AND FORTIFICATION

For Millers, Bakers, Cereal and Macaroni Manufacturers

Merck Enrichment Ingredients • Merck Vitamin Mixtures for Flour Enrichment • Merck Bread-Enrichment Wafers • Merck Vitamin Mixtures for Corn-Products Enrichment • Merck Vitamin Mixtures and Wafers for Macaroni Enrichment.

MERCK VITAMIN PRODUCTS for ENRICHMENT and FORTIFICATION

MERCK & CO., Inc. *Manufacturing Chemists* RAHWAY, N. J.

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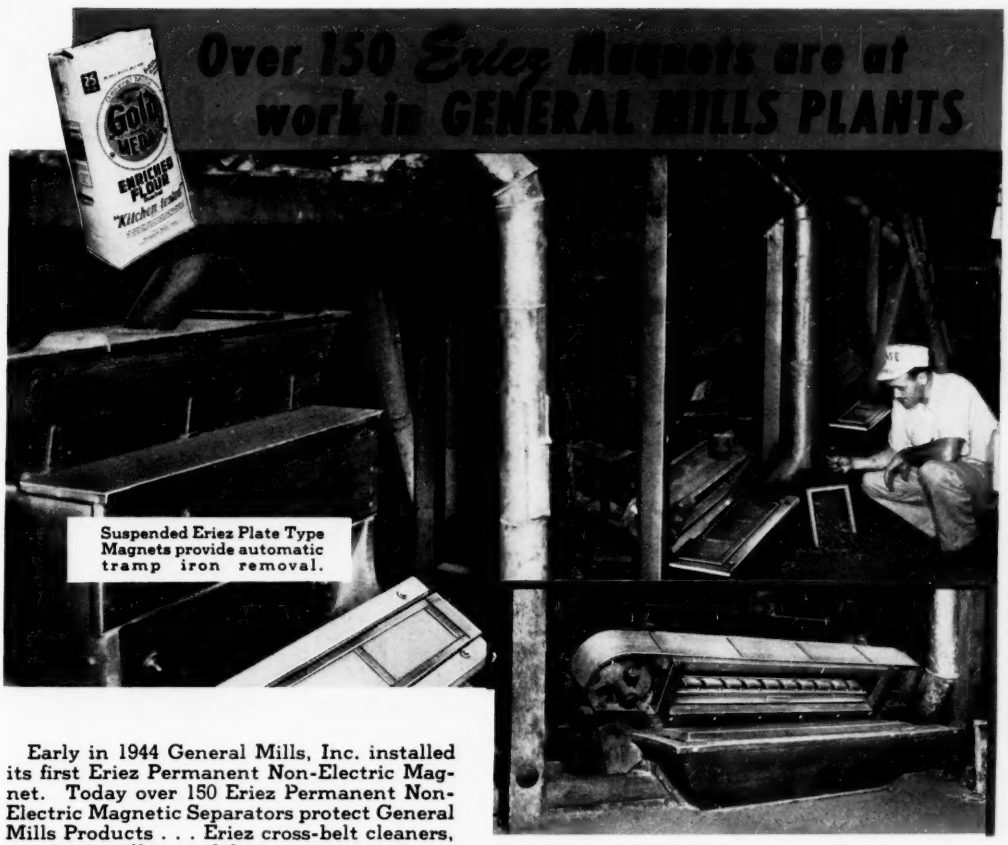
Over 150 Eriez Magnets are at work in GENERAL MILLS PLANTS



Suspended Eriez Plate Type Magnets provide automatic tramp iron removal.

Early in 1944 General Mills, Inc. installed its first Eriez Permanent Non-Electric Magnet. Today over 150 Eriez Permanent Non-Electric Magnetic Separators protect General Mills Products . . . Eriez cross-belt cleaners, magnetic pulleys and drums are in operation in General Mills modern plants throughout the country.

Thousands of others, like General Mills, have found that when the going is tough Eriez Permanent Magnets can do the job of removing tramp iron and reducing fire and explosion hazards.

Look at the installation above. Here are a few of many Eriez cross-belt non-electric magnetic separators in the Buffalo Plant of General Mills. These Eriez units remove tramp iron automatically . . . Eliminate the fire hazard caused by sparking metal and the arcing of electrically operated separators . . .

No electric current is required by Eriez Magnetic Separators. There's no maintenance or upkeep expense . . . Eriez magnetic strength lasts. Eriez Magnets operate at full power 24 hours a day. You, like General Mills, will find that the solution to your tramp iron problem is—Eriez Permanent Non-Electric Magnets.

Eriez Hinged, Spout Type, Magnetic Separators for Class A and for Class B installation have been approved by the Mill Mutual Fire Prevention Bureau. Write today for our new Food Bulletin describing the use of Eriez magnets in Food Plants.

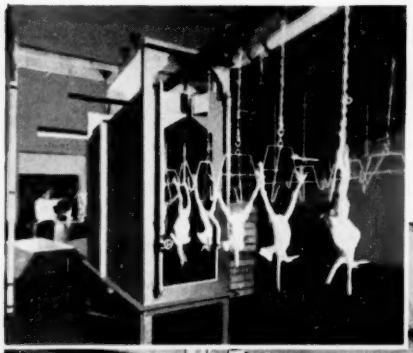
Pioneer of **PERMANENT** Magnetic Separation

SEE OUR CATALOG IN SWEET'S

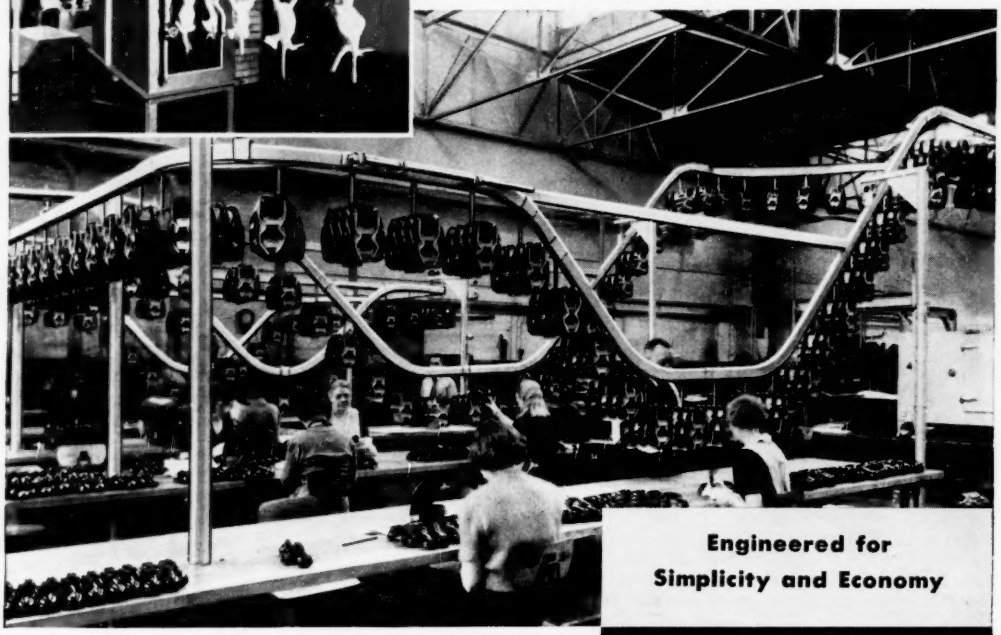
See our catalog P $\frac{1b}{2}$ Sweet's Processing Industries File

ERIEZ MANUFACTURING COMPANY

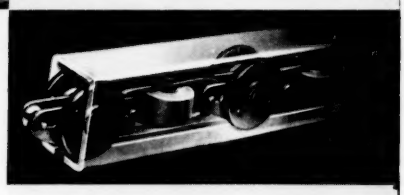
101 East 12th St. • ERIE, PA.



Turkeys or Telephones...



Engineered for Simplicity and Economy



***For handling efficiency and economy recommend* R-W Power Conveyors**

Efficient, economical handling and movement of materials means lower production costs. Today, in all kinds of plants, Richards-Wilcox Conveying Equipment is solving this handling problem to perfection. The extreme flexibility of R-W ZIG-ZAG Conveyors makes them readily adaptable to the most complex plant layout.

1880 • Over 69 Years • 1949

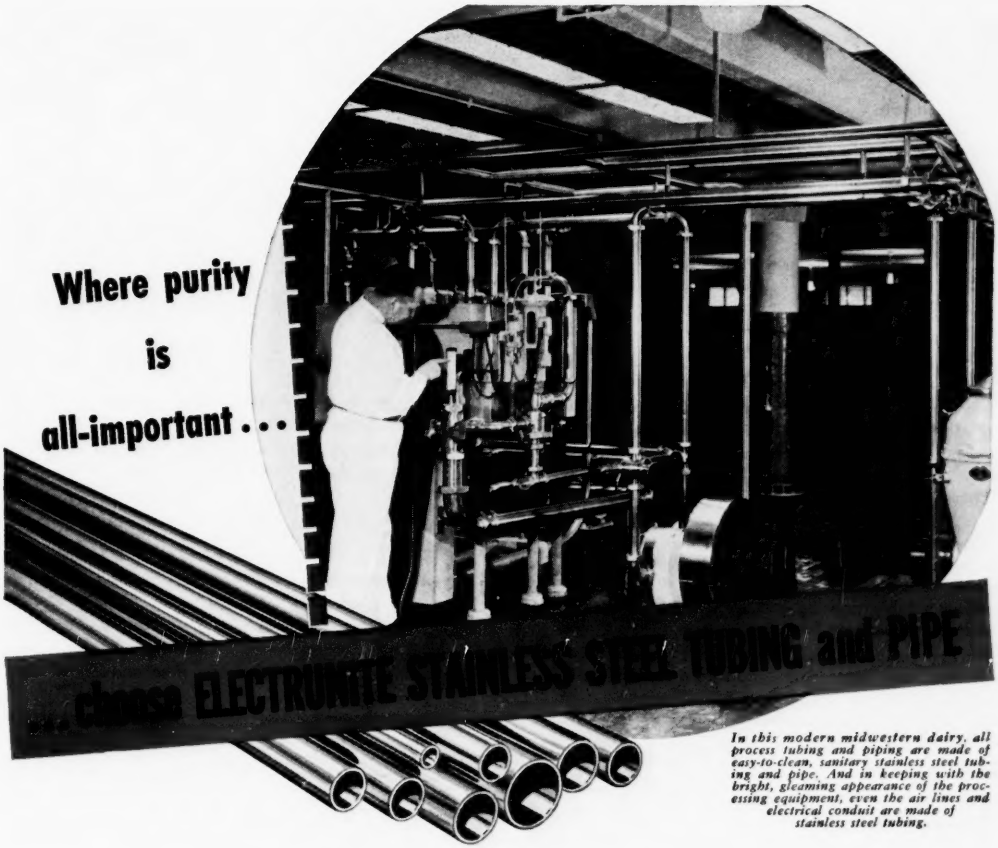
- Horizontal and vertical wheel units alternate in a continuous chain traveling through special steel tubing.
- Complete flexibility for installation in any plant. Easily installed, easily changed to conform to plant alterations.
- SAFE—all moving parts fully enclosed.
- Low first costs. Low power factor.
- Load capacity: Single suspension 65 lbs. per foot—double suspension 125 lbs. per foot.
- Standard horizontal or vertical curves—two-foot radius. (Stock load pendants including automatic turning units available.)

Richards-Wilcox Mfg. Co.

"A HANGER FOR ANY DOOR THAT SLIDES"

AURORA, ILLINOIS, U.S.A.

Branches: New York Chicago Boston Philadelphia Cleveland Cincinnati Washington, D. C. Indianapolis St. Louis New Orleans Des Moines Minneapolis Kansas City Los Angeles San Francisco Denver Seattle Detroit Atlanta Pittsburgh



In this modern midwestern dairy, all process tubing and piping are made of easy-to-clean, sanitary stainless steel tubing and pipe. And in keeping with the bright, gleaming appearance of the processing equipment, even the air lines and electrical conduit are made of stainless steel tubing.

● In the processing of food, chemicals, pharmaceuticals and many other products, there can be no compromise with cleanliness, sanitation and freedom from contamination. That's why ELECTRUNITE Tubing and Pipe —made of gleaming Republic ENDURO Stainless Steel—are widely used for countless applications in these fields.

Because stainless steel inherently is a sanitary, non-contaminating material, ELECTRUNITE Stainless Steel Tubing automatically affords these basic advantages. And as produced by Republic's *improved* electric welding processes, this *modern* tubing is uniformly ductile, strong, sound and round . . . free from scale and scale pits both inside and out.

Where purity is all-important, the extra cost of stainless steel is extremely inexpensive insurance against sub-standard product quality. For complete information about ELECTRUNITE Stainless Steel Tubing and Pipe, write today for the name and address of your nearest ELECTRUNITE Distributor.

REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION • CLEVELAND 8, OHIO
Export Dept.: Chrysler Bldg., New York 17, N.Y.

REPUBLIC STEEL
Republic
ELECTRUNITE
STAINLESS STEEL TUBING

DO YOU BLANCH AT LOW EFFICIENCY?

GET your product off to a good start with blanching that assures firmness, color and texture you'll be proud to put up against competition. Taylor's automatic Ratio Controller on your pipe blancher not only delivers these qualities—it gives you big steam savings and keeps supervision down to a bare minimum.

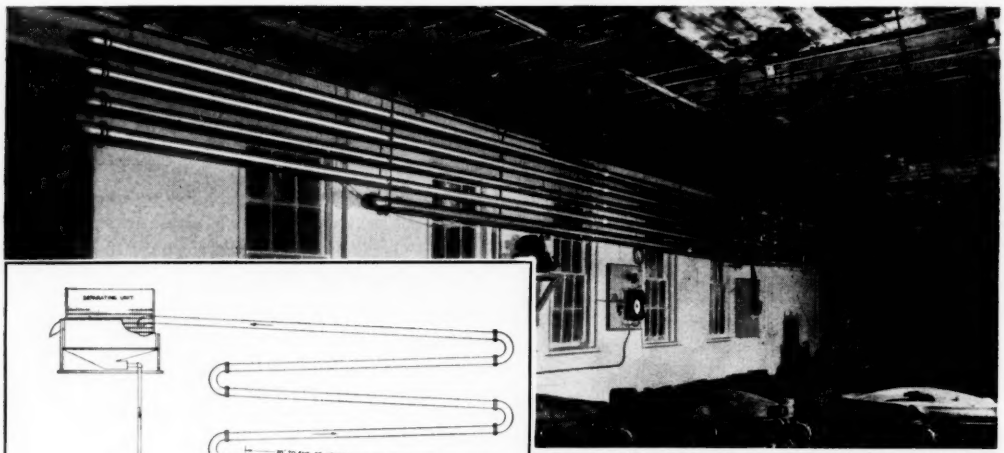
The Taylor Ratio Controller maintains the precise temperature required at the heater outlet. With this type of control, entrance of cold product to blanchers is sensed by an adjusting system that changes the control point of the controlling system. Result—your product is dependably and automatically held within the required temperature limits.

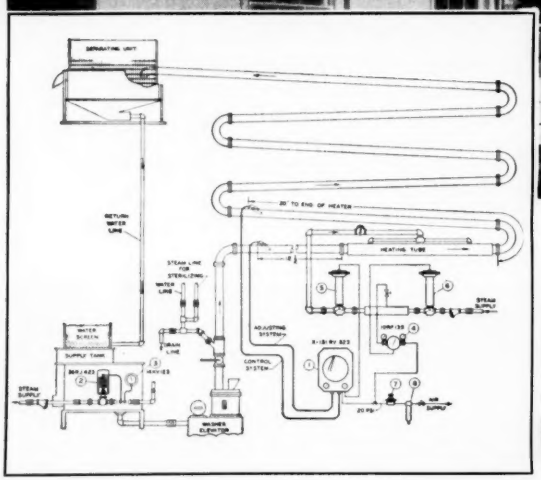
We're proud to say that Scott Viner Pipe Blanchers (like the one below) have been standard Taylor-equipped since 1935. Another example of an equipment manufacturer standardizing profitably on accurate Taylor Control. Taylor Control systems operate with equal efficiency on all types of blanchers.

For *complete details* ask your Taylor Field Engineer. He'll be glad to show you how Taylor is cutting costs in practically every canning operation: Blanchers, Lye Peelers, Exhausters, Retorts, Continuous Cookers, Cooling Canals, Juice Heaters, Deaerators, Jam and Jelly Kettles, etc. Write for Catalog 500! It gives you the whole story. Taylor Instrument Companies, Rochester 1, N. Y., or Toronto, Canada.

• • •

Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.





Taylor Ratio Controller "standard equipped" on Scott Viner pipe blancher

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

Employees like this easy-to-handle aluminum equipment

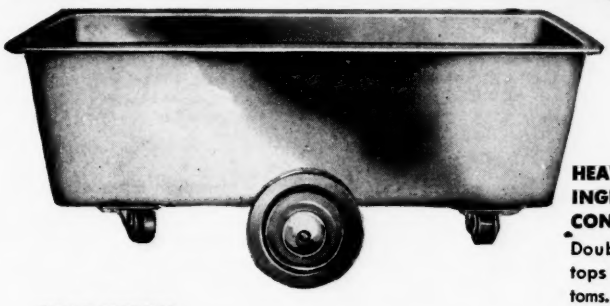
Light-in-weight Wear-Ever aluminum equipment brings cheers from the men who work with it, for it means less fatigue. It brings cheers, too, from those responsible for efficiency and *operating* costs. For the super-tough alloy from which Wear-Ever aluminum food equipment is made resists gouging and denting—gives many extra years of hard service. Mail the coupon below for full information on Wear-Ever Aluminum food plant equipment. The Aluminum Cooking Utensil Co., Wear-Ever Bldg., New Kensington, Pa.

TUBS

Strong and reinforcing ring at bottom closed with continuous weld. Reinforcing weld on handles. Seamless. Capacities 56 and 65 qts.

SEAMLESS PAILS

Strong and durable. In natural or Alumilite finish. Capacities 10, 12, 14, 16 quarts.



FOOD TRUCKS

Strong aluminum body. 14 cu. ft. capacity. Continuous welds eliminate cracks and crevices. St. John Neotread wheels.

HEAVY DUTY INGREDIENT CONTAINERS

Double-thick tops and bottoms. Beveled edges. 15 sizes from 8 to 200 qts.

WEAR-EVER

Aluminum

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT. OFF.

The Aluminum Cooking Utensil Co.
305 Wear-Ever Bldg., New Kensington, Pa.

Please send me further information about your

☐ Tubs ☐ Pails ☐ Food Trucks
☐ Ingredient Containers ☐ Complete Line

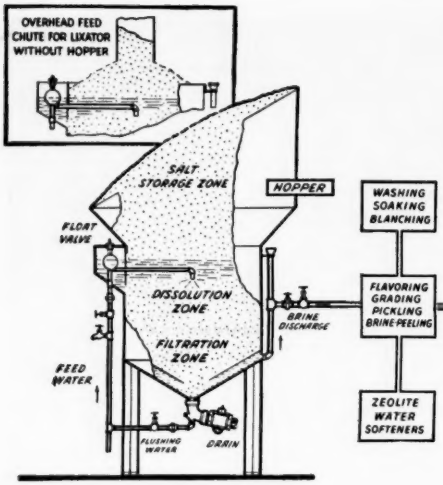
NAME_____

FIRM_____

ADDRESS_____

CITY_____ STATE_____

The LIXATE pipe line to efficient brine distribution



HOW THE LIXATOR WORKS

In the dissolution zone—Flowing through a bed of Sterling Rock Salt which is continuously replenished by gravity feed, water dissolves salt to form 100% saturated brine. In the filtration zone—through the use of the self-filtration principle originated by International, the saturated brine is thoroughly filtered through a bed of undissolved rock salt. The rock salt itself filters the brine. Nothing else is needed.

THE LIXATOR *automatically* provides 100% saturated crystal-clear, self-filtered brine that can be piped, by gravity or pump, anywhere . . . at any distance . . . it is needed in your plant.

JUST TURN A VALVE for Lixate Brine that meets the most exacting standards for chemical and bacterial purity . . . that can be diluted volumetrically to any desired strength.

THE LIXATE PROCESS for Making Brine cuts production costs as high as 20% . . . by cutting labor, time and waste in making brine. No hauling, measuring, stirring . . . YET ALWAYS a continuous supply of *accurately measured* brine.

Consult our Technical Service Department on your use of salt and brine. The experienced men on this staff will advise you on the proper location for Lixator and salt storage, pumping arrangements, types of pumps, meters, and valves. They will fit the *money-saving* Lixator into your plant operations. Write today!

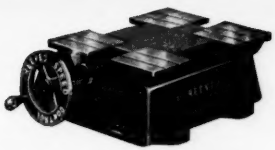
NOW AVAILABLE

The New Stainless Steel
STERLING MODEL LIXATOR
For "Lifetime" Use
For Greater Economy
For Added Cleanliness

The **LIXATE** *Process*
REG. U. S. PAT. OFF.
for making brine
INTERNATIONAL SALT COMPANY, INC.
Scranton, Pa.

Reeves Vari-Speed Motor Pulley

converts any standard constant speed motor to a low-cost stepless variable speed drive . . .

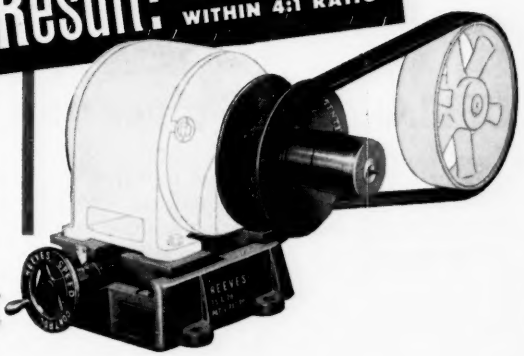


1. REEVES Motor Base provides sliding platform for motor. Handwheel or push-button control increases transmitted speed by moving motor toward driven machine, decreases speed by reversing the operation.

2. Disc Assembly connects directly to motor shaft. Assembly consists of two facing cone-shaped discs—one sliding laterally—and compression spring for mounting on motor extension shaft.

3. Special V-Belt hooks up unit with driven machine. Belt fits between discs and over pulley on power input shaft of driven machine. Belt is adjusted to minimum center.

Result: INFINITELY VARIABLE SPEED WITHIN 4:1 RATIO



Unit instantly delivers any desired speed over entire range and maintains that speed without fluctuating even a fraction of an rpm.

The REEVES Vari-Speed Motor Pulley is the easiest, lowest-cost method of converting a machine with fixed speeds into a highly versatile unit of infinitely variable speed adjustability. Thus equipped, it can handle a wider range of work, better, faster and more economically, because machine speed can be changed instantly and accurately—without shutdowns—to meet the needs of every operation and every operator, *under every changing condition.*

This REEVES unit forms the actual driving element between motor and driven shaft . . . eliminates all auxiliary equipment such as chain drives, gears, belts, etc., . . . requires virtually no more space for installation than any standard belt or chain drive. It is built in eleven sizes, transmitting from 1/8 to 15 hp. over speed ratios from 2¼:1 to 4:1, inclusive.

The complete line of REEVES Speed Control equipment also includes two other basic units, the Variable Speed Transmission and the Motodrive, which are offered in the widest selection of designs, sizes, capacities and speed ratios—with handwheel, push-button or entirely automatic controls.

REEVES units have proved their ability to speed production, cut cost and increase profit in more than 260,000 widely diversified industrial applications . . . are listed as standard equipment on over 2,100 different makes of modern machines.

An experienced REEVES Speed Control specialist will be glad to work with you in selecting the units best suited to your needs. Write today, arranging an interview, and ask for the comprehensive 114-page catalog FD7-450A.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

Recognized Leader in the Specialized Field of Speed Control Engineering

ACCURATE • VARIABLE

Reeves Speed Control

GIVES THE RIGHT SPEED FOR EVERY JOB!

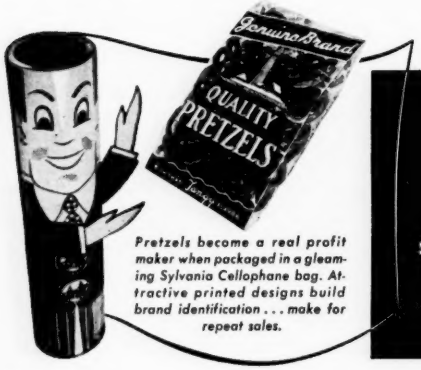
CELLOPHANE gives you all this in one package

Name your packaging requirements! Whatever your product calls for, there is a Sylvania Cellophane to give it the utmost in protection and gleaming beauty that means sales.

For example take Sylvania Cellophane in one of the MS types. Because they are truly transparent, they give your product extra visibility . . . let it sell itself. They resist grease . . . keep foods from drying out and free from contamination. Their uniform strength and heat sealing qualities make them easy to apply either by hand or automatic equipment.

Talk over your packaging problems with the Sylvania representative. He'll be glad to help you determine the combination of properties needed for your products. Or write to Market Development, Dept. F-5, for information, mentioning the specific application in which you are interested.

You'll find us most cooperative.



Pretzels become a real profit maker when packaged in a gleaming Sylvania Cellophane bag. Attractive printed designs build brand identification . . . make for repeat sales.

SYLVANIA CELLOPHANE

SYLVANIA CELLOPHANE

SYLVANIA DIVISION AMERICAN VISCOSE CORPORATION

Manufacturers of cellophane and other cellulose products since 1929

General Sales Office 350 Fifth Avenue, New York 1, N. Y.

Plant Fredericksburg, Va.

On thousands of applications, stepless variable speed operation assures exactly the right speed for every operation . . . for each operator . . . the right speeds for each change in the consistency or shape of the material being processed. Such variable speed operation gives you plus value in higher rates of production, a better quality product and more efficient performance of your equipment and your operators.

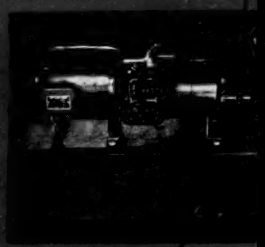
Master Speedrangers provide this infinitely variable speed in compact, all-metal, mechanical variable speed units in a wide range of types and in sizes up to 5 horsepower.

variable speed operation gives you PLUS VALUE

For example, see how the Speedranger on this Rockwell packaging machine incorporates an electric motor, a variable speed unit and a gear reduction unit . . . all standard Master units that easily combine into a compact, integral power package. This provides exactly the RIGHT horsepower, the RIGHT range of speed, the RIGHT features, in a unit that you can use RIGHT where you want it.

Write for Data 7525, a new 24-page book on Speedrangers, and see what a real job they can do for you.

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO



The all-metal construction of Master Speedrangers adds greatly to the compactness and durability of this job.

MASTER SPEEDRANGERS

This Lukenweld Steel Drier Roll was put to work early in 1934 on a paper machine at Downingtown Paper Company, in Downingtown Pennsylvania.

This Lukenweld Steel Drier Roll has stayed *round* through 14 years of service

Recently removed for the repair of a worn journal caused by faulty lubrication, this 14-year-old roll gave Downingtown Paper Company's engineers an opportunity to check every detail. Their findings confirmed these facts, similarly proved by previous examinations of dozens of other Lukenweld Rolls:

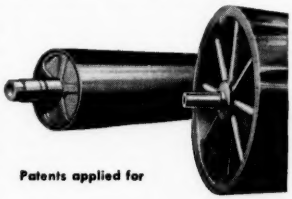
STABLE DIMENSIONS. Although in use on a paper machine ever since 1934, this 42″ Lukenweld Steel Drier Roll is still round to within a tolerance of 0.004″. (The machining tolerance was ±.005″.) The tolerance has scarcely changed in over 14 years.

LONG-LIVED. On the interior surfaces of the chamber in which steam circulates, there were no evidences of corrosion.

STRONG AND SAFE. After the journal was repaired, this Lukenweld Roll was ready to go back to work, sound as the day it was installed 14 years ago.

Hundreds of Lukenweld Jacketed Steel Drier Rolls, at work in various industries, have proved they dry faster, better and safer. *Faster* because of reduced wall thickness and higher efficiency. *Better* because surface temperatures are even and constant. *Safer* because of their welded steel construction—steam pressures as high as 350 psi are permissible.

For Bulletin 358 giving data on drier rolls, or for help on complete machines, write Lukenweld, Division of Lukens Steel Company, 401 Lukens Building, Coatesville, Penna.



Patents applied for

We'll lend you "LUKENWELD", a 16mm motion picture with sound, highlighting our methods, facilities and products. Running time: 20 minutes. Write for booking date.

LUKENS
LUKENWELD DIVISION

DESIGNERS, ENGINEERS AND MANUFACTURERS OF MACHINERY

JAMISON-BUILT DOORS

For Use in Zero° F. and Below

TO MEET YOUR SPECIFICATIONS

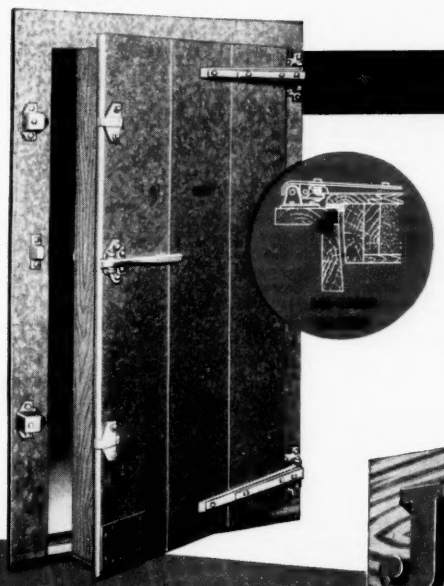
SUPER FREEZER DOOR

Time Proven Overlap Type

The Super Freezer Door made industrial use of sub-zero temperatures practical. Overlap type of construction permits insulation to any desired thickness. The sealing and insulation efficiency of its 4" wide by ⅜" thick, resilient, moisture impervious gasket is exceptional. The unusually strong hardware of special design, supplied as standard equipment on the Super Freezer Door, is largely responsible for its outstanding performance.

Hinges are: Jamison Adjustable Spring Hinges (Pat. No. 1987512). Fastener: Jamison 031 (single point) Roller Fastener (Pat. No. 2083458).

For only slight additional cost Jamison E-Z-Open (Two-Point) Fastener as illustrated (Pat. No. 2147794) will be furnished. Warm side (Front or Back) of Super Freezer Door is covered with No. 20 gauge galvanized steel forming effective vapor barrier and eliminates possible deterioration due to moisture precipitation.



LO-TEMP DOOR

Infitting Type for Low Temperature Use

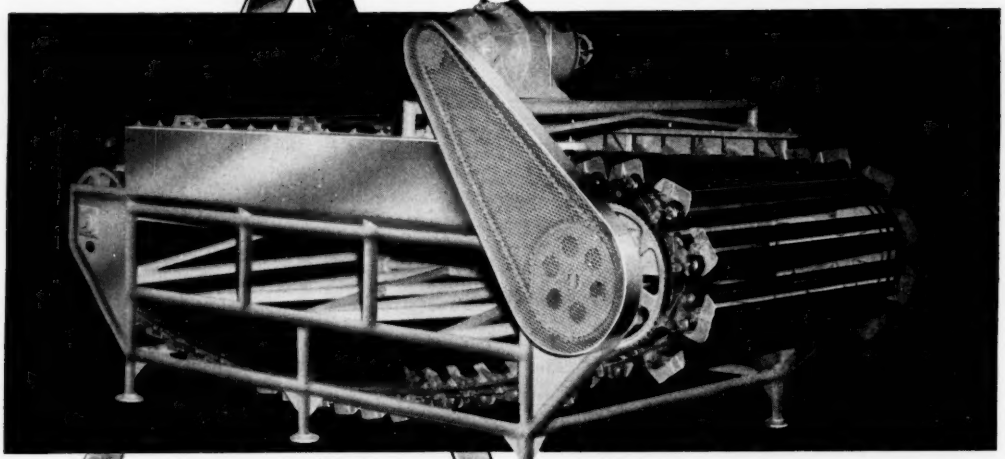
A single cellular rubber gasket encased in a moisture impervious skin provides the perfect plug-plus-surface seal. Uniform gasket compression is assured by Jamison E-Z-Open (Two-Point) Fastener (Pat. No. 2147794) in combination with Jamison "Adjustoflex" Hinges, (Pat. No. 2208310). To eliminate possible deterioration due to moisture precipitation the top of door is equipped with a metal cap—front, edges and casing are covered with No. 26 gauge galvanized steel sheet. The Lo-Temp Door satisfies the demand for a door of the infitting type for use in temperatures as low as minus twenty (—20°) Fahr.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

The Oldest and Largest Builders of Cold Storage Doors in the World

ATLAS PACIFIC GRADERS



for
FAST, ACCURATE AND GENTLE SIZE CONTROL

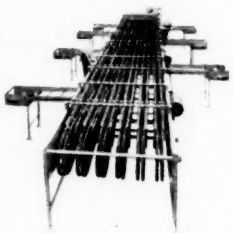
Atlas-Pacific graders, regardless of type, have several things in common:

They are engineered along the very latest field-tested principles for accurate grading, for ready adjustment, for high accuracy production, and for gently handling the product to prevent damage, and thus increase case yield.

The modern food processing plant can readily be equipped with an Atlas-Pacific grader of the correct type and size for the more efficient and profitable grading of any type of food product. Your inquiry is cordially invited.

DROP ROLL GRADER *(illustrated above)*. For tomatoes, peaches, oranges, apricots and other whole fruit. Built for the food processor who demands extremely accurate and maximum grading capacity. The rollers continuously and gently rotate the product, spreading it in a single layer which avoids piling, resulting in a more methodical grading procedure. The sturdy tubular construction, heavy duty steel rollers and grading size control, makes this grader the ideal unit.

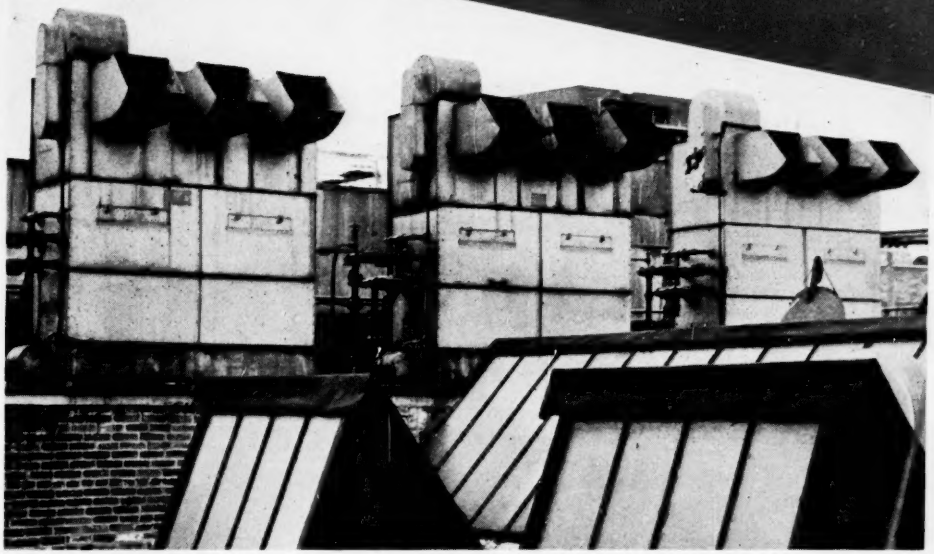
ROPE GRADER. A big volume grader for pears, apricots, freestones and other fruit requiring gentle handling. Product drops between gradually diverging round rubber belts moving in same direction. The fruit is collected according to size by one of several cross conveyors or collection belts. Grading size adjustments from 1⅛" to 4½" can readily be made along the entire length of the machine.



SENIOR GRADER. The Atlas-Pacific 8-Screen 9-Grade Shaker Grader is the largest ever built. The advantage of having this unit is its adaptability for uses with either halved or whole products, thus serving the purpose of several machines. Products can be fed onto a dirt screen or water pan, depending upon the products being run. Screens adaptable to each operation are readily changed and accurate to a thousandths of an inch. For further complete detailed specifications, write today.

Manufacturing STANDARD and SPECIAL food processing equipment

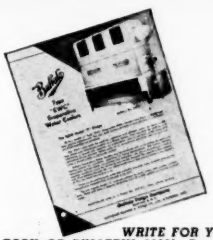
Here's EFFECTIVE SIMPLIFIED LIQUID COOLING!



"Buffalo"

EVAPORATIVE COOLERS

- Simple to install
- Simple to operate
- Simple to service
- Low-cost Cooling!



WRITE FOR YOUR FREE COPY OF BULLETIN 3666! Contains construction and capacity data as well as sectional drawing to give you the complete picture.

A "Must" For Every Engineer!

FAN ENGINEERING, 5th Edition, gives you 808 pages packed with helpful facts on every phase of air handling. Pocket size.

$6.00

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IN three basic interchangeable sections—blower head, coil section and tank—"Buffalo" Evaporative Coolers are very compact, simply designed units for closed-system liquid cooling. They cool positively and dependably—by rapid spray evaporation on cooling coils. They save valuable space, too (Size F-20, for example, stands 74½" high and is 23" wide, without fan motor mounted), and are easier to move into your plant and install. Available for outdoor use. YOUR BUFFALO REPRESENTATIVE will be happy to give you complete details on this low-cost, trouble-free cooling.

"Buffalo" FIRST FOR FANS

BUFFALO FORGE COMPANY

152 MORTIMER ST. BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont., Branch Offices in all Principal Cities

VENTILATING FORCED DRAFT | AIR WASHING COOLING | AIR TEMPERING HEATING | INDUCED DRAFT EXHAUSTING PRESSURE BLOWING

What's the COST of "low-cost" hauling?

THE cost of *any* truck is the total amount of money you invest in it . . . as long as you own it.

That cost is usually far different from the truck's original price!

It can be far higher, for example, when you buy a truck that's too big or too small for the hauling job it has to do.

In such cases, costs go up rapidly . . . in wasted gas and oil, in repairs, in shortened truck life, in time lost on the job.

It's important, therefore, that *your* truck be engineered and built . . . to fit *your* job! That's what is meant by a "*Job-Rated*" truck!

Only Dodge builds "*Job-Rated*" trucks. Every one of these trucks has the right one of 7 truck engines . . . "*Job-Rated*" for top efficiency and maximum economy. Every Dodge has the *right* chassis unit . . . from engine to rear axle . . . "*Job-Rated*" to fit *your* job, to save *you* money.

So if you're looking for the "*lowest-cost*" truck . . . ask your Dodge dealer to show you the "*Job-Rated*" truck that fits *your* job! Such a truck will give you the best *value* in transportation you can buy.

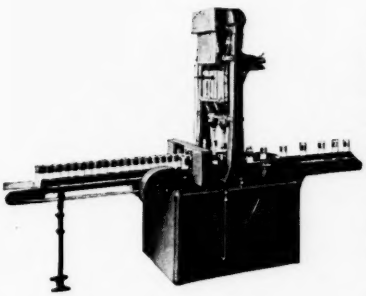
See or Phone Your Dodge Dealer

For the good of your business—

Switch to DODGE "Job-Rated" TRUCKS

See our exhibit at "Food Distribution Exposition," St. Louis Auditorium, May 30-June 1, Spaces 254, 5, 6, and 317

. . . they chose US



The NEW Model JK
Fully Automatic Volume Filler Weigher or Packer

The packer of the spices illustrated above economically solved his filling problem with ***U S.*** Using the new fully automatic, twin station Model JK Packer, you too can achieve dollar saving results. And operators will praise its clean, efficient operation and its many new features.

The Model JK fills with closest accuracy up to 60 containers per minute on all kinds of powdered and granular materials. Normally the operation of this automatic machine is to fill by packing under controlled pressure; for those materials that require settling rather than packing, the new vibrating filling platform is furnished.

An efficient dust collector hood at the filling stations collects any escaping particles, keeps the machine and surrounding air clean and free of annoying dustiness. This, combined with the new shut-off gates which eliminate the drip at the augers, makes the filling operation absolutely clean.

Combine the foregoing with other new features designed to provide efficiency in performance and convenience for the operator and you have a machine that is the last word in modern high-speed powder filling.

Send U.S. details on your packaging problems — we have the machines and engineering background to solve them.

US *Automatic Box Machinery Co. Inc.*

Owning and Operating

NATIONAL PACKAGING MACHINERY CO. • CARTONING MACHINERY CO.

69 ARBORETUM ROAD, ROSLINDALE, BOSTON 31, MASS.

Branch Offices: NEW YORK CLEVELAND
LOS ANGELES ERUGH EQUIPMENT A

Streamline your plant for Profit . . . with the One-Man Cook-Room*

SAVE . . . labor of loading cans into baskets
SAVE . . . transferring baskets to and from retorts
SAVE . . . transferring of cans to cooling area
SAVE . . . by eliminating separate cooling tanks
SAVE . . . unloading of cans from retort baskets
SAVE . . . stacking of cans for labeling
SAVE . . . floor space used for cooling tanks and basket storage

*FMC Continuous Pressure Cooker and Cooler

Your ability to save labor, cut costs, and produce top quality canned products may spell the difference between profit and loss in the highly specialized and competitive canning industry.

Strip your plant for action by replacing outmoded equipment with FMC Continuous Pressure Cookers and Coolers. Then, one man at the control panel does the work of a whole cook-room crew.

And that's not all. These FMC Continuous Sterilizing lines make it possible for you to reduce time of required cook, increase cook-room capacity, and improve flavor, appearance and quality of your pack.

Current models include many important improvements. For full information sign and send the coupon.

FOOD MACHINERY CORPORATION
Anderson-Barngrover Division
San Jose, California
Please send me a copy of your booklet
"The One-Man Cook-Room"
Name_____
Address_____

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FOOD MACHINERY CORPORATION

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ANDERSON-BARNGROVER DIVISION General Sales Office SAN JOSE 5, CALIFORNIA
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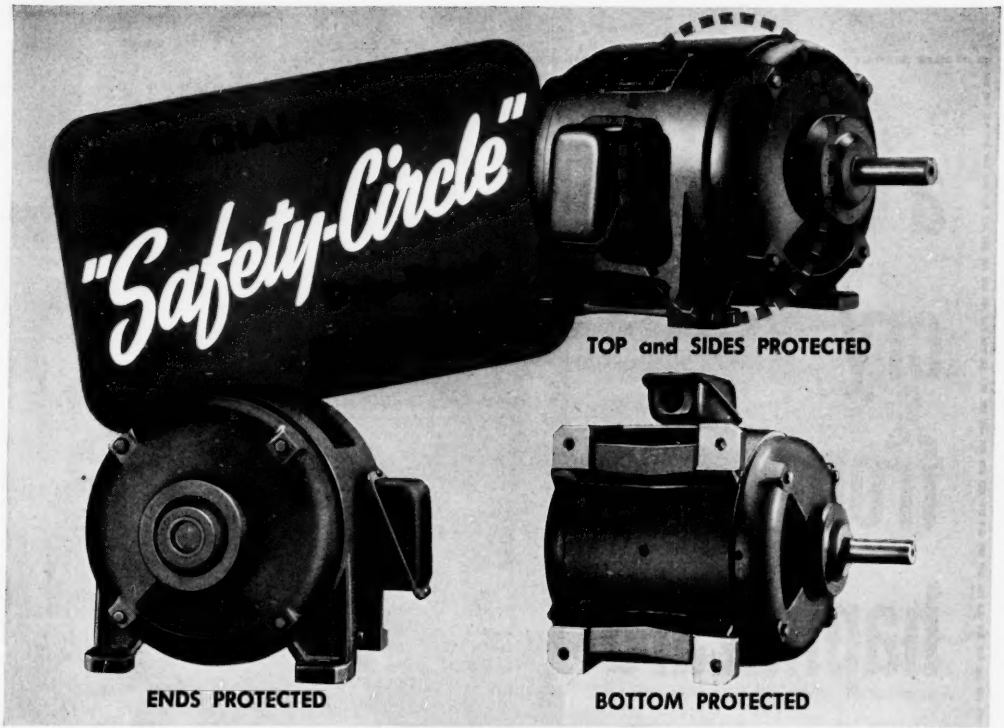

Get All-Around Motor Protection with

SAFETY-CIRCLE

THAT SOLID CAST IRON FRAME protects SAFETY-CIRCLE working parts against physical damage from every angle. The completely enclosed bottom provides extra protection and extra strength. End brackets are drip-proof at no premium.

Because the frame is cast iron, it is resistant to rust and corrosion. It withstands physical abuse and will not distort.

Protected Inside, Too

SAFETY-CIRCLE protects against internal breakdown with multiple-dipped and baked stator and die-cast aluminum rotor. *Ball bearings are factory-lubricated and need no attention for years.* Wide open internal construction and large fans keep temperatures well within rated limits.

Don't be satisfied with a motor that gives you less than full protection. Insist on the extra protection of SAFETY-CIRCLE.

For complete details on SAFETY-CIRCLE advantages, see your A-C Authorized Dealer, Sales Office, or write for Bulletin 51B6210B. Sizes from 1 to 20 hp, 326 frames and smaller. Safety-Circle, Texrope and Vari-Pitch are Allis-Chalmers trademarks.

A-2689

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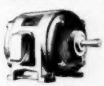
ALLIS-CHALMERS

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

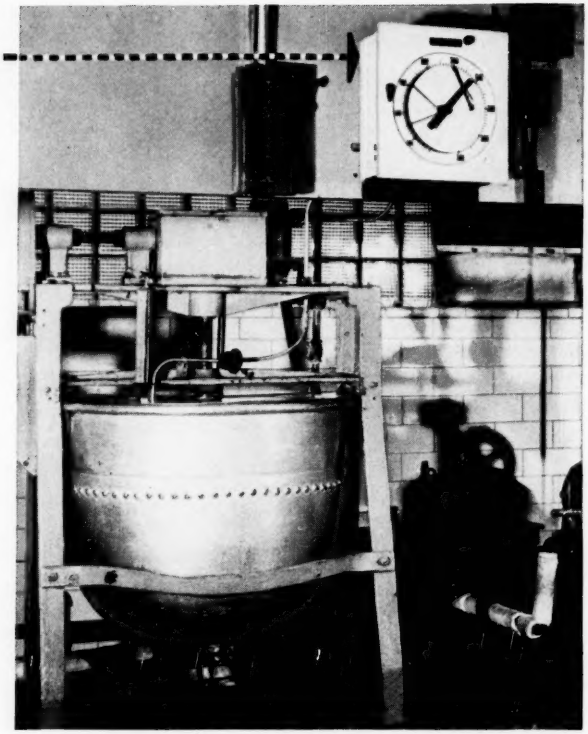


MOTORS — ½ to 25,000 hp and up. All types.

TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

a far cry from haphazard



Brown *ElectroniK* Control for Batch Cooking

Bringing a new concept of precision and speed to batch cooking, the Brown *ElectroniK* system is a far cry from "by-guess and by-gosh" methods and sets the pace for new, advanced techniques.

Typical results are found in its application to the processing of jams, jellies and preserves. Its sensitive control of critical temperature produces products of better palatability and appearance. The system affords accurate, automatic termination of the cook at the predetermined end-point. Color, flavor and concentration are held to your standards . . . and the uniformity of results gives you the exact same batch every time, eliminating rejects.

Call in your local Brown engineer for a discussion of *ElectroniK* Control for your kettles . . . or write for a copy of Data Sheet 3.2-1 for detailed information.

MINNEAPOLIS-HONEYWELL REGULATOR CO.
BROWN INSTRUMENTS DIVISION
4502 Wayne Ave., Philadelphia 44, Pa.
Offices in principal cities of the United States, Canada and throughout the world

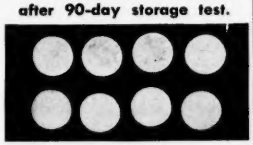
Honeywell *Advanced Instrumentation* FOR THE FOOD INDUSTRY BROWN INSTRUMENTS

FOIL

ALCOA PACKAGING REPORT NO. 49-2

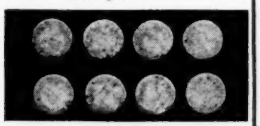
90 day accelerated test proves drug tablets stay potent... firmer...in Alcoa Foil Wrap

Benzedrine sulfate tablets after 90-day storage test.



Sample A

Package material—Alcoa Foil (See "Conclusions")
Color of tablets—Slightly grey
Firmness of tablets—¾ std.
Original average wt. of twenty tablets—6.1423 gm. Average wt. at end of test—6.1470 gm.
Gain—.0047 gm.



Sample B

Package material—As used at time of test
Color of tablets—Badly discolored
Firmness of tablets—Very soft
Original average wt. of twenty tablets—6.1423 gm. Average wt. at end of test—6.9704 gm.
Gain—.8281 gm.

Object of lab test: to evaluate aluminum foil's package protection for cold pressed drug tablets, when subjected to relatively high temperature and humidity. Storage time—90 days; temperature, 106° F; relative humidity, 90%.

Conclusions: ".001" 2S-O Alcoa Aluminum Foil, laminated to transparent sheeting with thermoplastic heat-seal coating on the opposite side of the foil, gives superior protection to drug tablets. Keeps them firmer . . . preserves potency better than other wrapping materials tested." To give your perishable product better protection, wrap it in Alcoa Foil. For the names of package manufacturers who are experienced in working with foil, write ALUMINUM COMPANY OF AMERICA, 1845 Gulf Building, Pittsburgh 19, Pa.

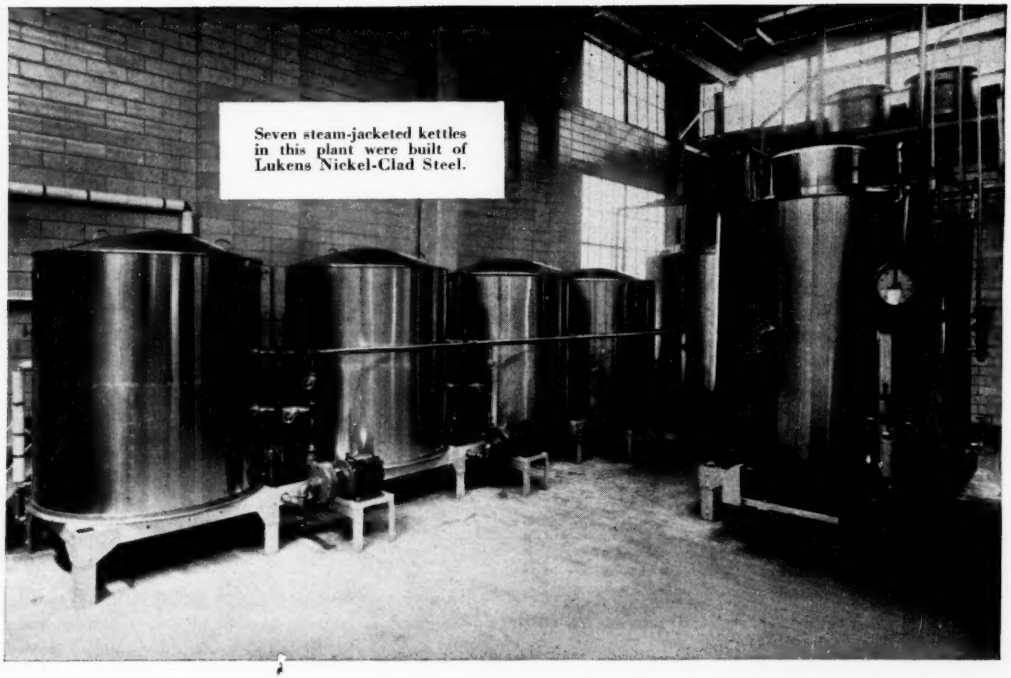
End of test—examining drug tablets in Alcoa Packaging Laboratory, Edgewater, N. J.

Further information about the results of Alcoa Packaging Laboratory tests is available. Write us concerning your packaging problems.

ALCOA ALUMINUM

ALCOA ALUMINUM FOIL

THE QUALITY PACKAGING MATERIAL FOR QUALITY PRODUCTS



Seven steam-jacketed kettles in this plant were built of Lukens Nickel-Clad Steel.

When your supplier says,

"IT'S MADE OF A LUKENS CLAD STEEL"

You are getting equipment having the advantages offered by *thick* sections of nickel, stainless steel, Inconel or Monel, but at the lower cost of clad steel. That's because the plate is a combination of the corrosion-resistant metal (usually 10% or 20% of total plate thickness) and mild steel, permanently bonded together.

Thus your equipment will have long life and will not cause metallic contamination of the foodstuffs you're processing. It will be easy to keep clean because of the extra-smooth sodium hydride finish. In addition, clad steels transfer heat more rapidly than most of these solid corrosion-resistant metals.

Lukens makes Nickel-Clad, Stainless-Clad, Inconel-Clad and Monel-Clad Steels, enabling the manufacturer to select the material best meeting your requirements.

Whether you're needing small kettles or giant autoclaves, ask your supplier to quote on equipment made of Lukens Clad Steels. For additional information, write for Bulletins 255 and 338. Lukens Steel Company, 401 Lukens Building, Coatesville, Penna.

LUKENS

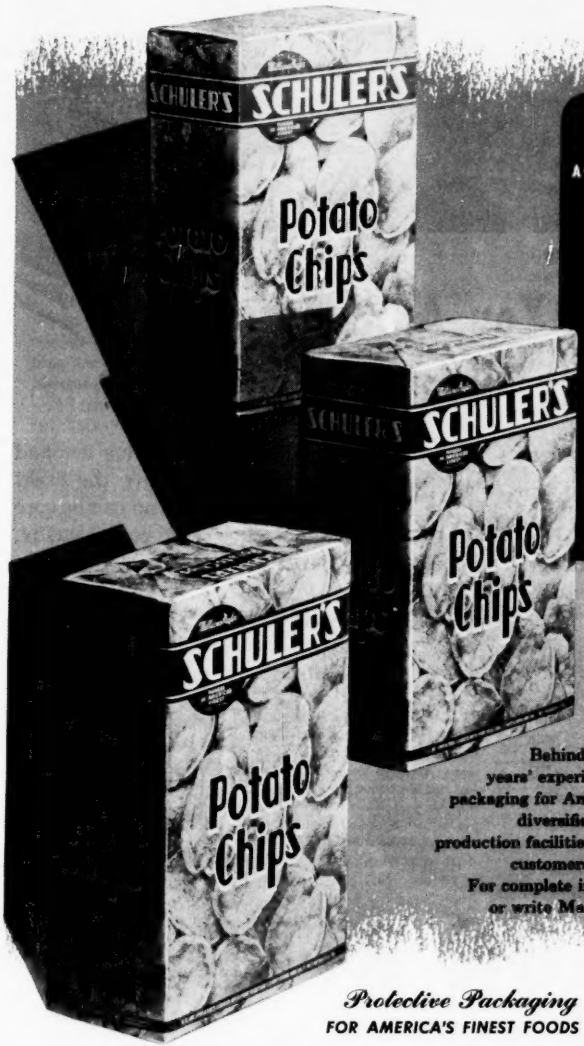
Nickel-Clad Stainless-Clad
Inconel-Clad Monel-Clad
STEELS

SOLID METAL ADVANTAGES WITH CLAD STEEL ECONOMY

Marathon Waxed Paper Overwraps Provide...

Appetite Appeal + Protection!

✳ Marathon Waxed Paper Overwraps have been selected to provide protective, sales-building outer wrapping for the famous Schuler's Potato Chips. Waxed paper's pure white opaque surface faithfully reproduces *in natural color* the appetizing good looks of the product inside. Freshness and flavor are *completely sealed in* by these moistureproof, heat-sealing wrappers. Marathon Waxed Paper Overwraps lend themselves perfectly to automatic machine packaging . . . with electric eye cut-offs for precision spotting of the wrapper on the box.



CHECK WAXED PAPER'S ADVANTAGES AGAINST ANY OTHER TYPE OF OVERWRAP!

- ✳ **Protection** . . . Firm sealing, moisture-proof waxed paper provides efficient product protection.
- ✳ **Adaptability** . . . Available in a wide range of weights and grades.
- ✳ **Economy** . . . Waxed paper is exceptionally *low* in original cost.
- ✳ **Workability** . . . Operates at peak efficiency on standard automatic packaging lines.
- ✳ **Designs** . . . Unlimited package design possibilities for modern merchandising.

Behind every Marathon product today stands 40 years' experience and leadership in the manufacture of packaging for America's great food industries. Marathon's diversified supply of raw materials and integrated production facilities from pulp to printed package assure our customers of the best in protective food packaging. For complete information, ask your Marathon salesman, or write Marathon Corporation, Menasha, Wisconsin.

Protective Packaging
FOR AMERICA'S FINEST FOODS

MARATHON

Close to You Anywhere, Ryerson Stocks—Ryerson Service

No matter where you are, or where you want steel delivered, there's a Ryerson plant, with diversified Ryerson steel stocks, within quick shipping distance. A network of thirteen big plants, plus twelve district sales offices, makes Ryerson steel service the most comprehensive and convenient in the nation.

Each big Ryerson plant is set up to operate independently with large stocks and high-speed cutting and handling facilities, plus its own complete staff of carbon, alloy and stainless steel specialists. Yet each Ryerson plant and office offers the advantages of a unified organization with a hundred and six years of practical steel experience.

These days, with the record-breaking demand for steel, we may not always have the exact size or quantity you need. But you can be sure we will do our very best to serve you. Usually, from long experience, we are able to suggest an available alternate steel. So, for steel and steel service, call the Ryerson plant or office nearest you.

Need Stainless? . . . Call Ryerson

Your nearby Ryerson plant is a quick, convenient source for everything in stainless steel. Bars, plates, sheets, tubing, pipe and other stainless products in many types and finishes are on hand. And stainless from Ryerson stocks means Allegheny stainless, the time-tested product of America's oldest stainless producer. Need stainless? Call Ryerson.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS: NEW YORK, BOSTON, PHILADELPHIA, DETROIT, CINCINNATI, CLEVELAND, PITTSBURGH, BUFFALO, CHICAGO, MILWAUKEE, ST. LOUIS, LOS ANGELES, SAN FRANCISCO

MAY, 1949

Food Industries

Don't Let Poor Packaging Pilfer Your Profits

No unit operation in the food processing industries is more generally and intensively employed than packaging. Few represent greater investment in equipment and supplies and involve more labor. Not many are of greater importance to product quality and consumer acceptance.

It goes without saying, then, that inefficient packaging lines and improper packages can be extremely costly. And, conversely, improvements in the equipment and containers will yield very substantial returns.

Packaging has come a long way since the cracker-barrel days. It has passed through the stages of conversion from bulk to consumer-size containers and then the development and application of a host of new and better flexible packaging materials and improved rigid containers and closures. While the latter phase continues, the third chapter in packaging history now is being written. We refer to the era in which the major emphasis is on high efficiency in packaging operations and calculated economy in packaging materials.

Unfortunately, the backlog of demand for equipment during the postwar years somewhat slowed the normal rate of improvement in machines. But manufacturers for the most part have caught up with orders, and the next 12 to 18 months undoubtedly will see the introduction of many more new and better models.

These faster machines will help to gear the packaging line to the increased tempo of the production line. This is essential if packaging bottlenecks are to be avoided.

It is to be hoped, too, that the new models will require less trouble-shooting, less frequent adjustment, and not so much maintenance. Greater flexibility in handling containers of different sizes also is desirable. Improvements in these directions are necessary if packaging costs are to be reduced to a satisfactory level.

But equipment of advanced design will solve only one phase of the complex food-packaging problem. There is a multitude of other problems. These include the selection of the proper machine for the job and the development of a package which performs efficiently on the production line, is economical in materials costs, properly protects the product, and has good merchandising characteristics. To reach the best solution to each of these problems requires the combined knowledge, judgment, and efforts of top management, production and sales executives, technologists and engineers—yes, even lawyers.

In many cases, more know-how goes into the development of a successful, yet economical package, than goes into the formulation of the product itself. And in the end the package is seldom 100 percent on all counts. Compromises with perfection must be made on various characteristics of a container if the best overall design and performance are to be achieved.

Any company faced with the problem of developing a new package or improving an existing one really has an assignment on its hands. In addition to bringing nearly everyone with a major company-responsibility into the act, the company must check and evaluate a long list of detailed factors pertaining to the package. To provide a guide to this procedure, we have prepared a comprehensive check-list in convenient wall-chart form (see insert, behind front cover). And we also present in this issue (page 99) a series of case histories to demonstrate the procedure followed in the development of a successful food package.

The check-list can be used in evaluating your present package, as well as in developing a new one. And there is a good chance that a check of an old container will reveal unsuspected faults which can be profitably corrected.

A few years ago, a FOOD INDUSTRIES survey bought to light 260 mistakes which were being made in packaging. In spite of considerable progress, many of those mistakes still are being made. And there is no better time than now to run them down and correct them.

—F. K. LAWLER, *Editor*

The Talk of the Industry

How To Detect a Depression

Any food man who wants to know whether a serious recession is on next month's calendar will waste his time if he asks either Washington or Wall Street. For our business, there is a much more useful source of guesses. The best man to ask is a sales executive whose organization is distributing a variety of consumer goods of varying qualities.

If he says that he is having trouble selling his super-deluxe line, don't worry. But if the deluxe or choice or grade A goods are not moving, then it might be well to be sure that there is an extra hole in your belt so that you can tighten up one more notch. And if he says he cannot even move standard goods any more, then let us have two or three holes in the belt.

But it is well known that there is no sure way of forecasting business trends.

Play Safe and Invest in Efficiency

Words of wisdom from Theodore G. Montague in his report to Borden stockholders:

"The bulk of our 1949 expenditures will be for new equipment and plant modernization, a relatively small part being allocated for new building. It is quite possible that 1949 trends in construction costs will confirm the wisdom of our conservative policy in regard to new plants. By building only when absolutely necessary, we prepare for the future when many businesses will find that the high fixed costs, assumed during a boom, are an operating burden in less prosperous times."

In plain English, it's smart to spend your money for efficiency, which is certain to pay dividends.

Sanitary Confusion—Prelude to Progress

Wherever you go in the baking industry you hear the same story. It goes like this: The health authorities are pressing for changes in machines to make them even more sanitary and more easily cleaned.

The result has been much confusion, if not consternation, among bakers and manufacturers of baking equipment. No one knows quite what to do. Equipment builders hesitate to spend a lot of money in developing a new model when there is uncertainty as to whether health authorities will approve it.

Bakery engineers discussed this problem at their recent convention, and concerted action is being taken. No doubt all will end well, and everyone will profit through progress. Meanwhile, the baker moans every time a department of health man says: "You ought to do it the way they do it in the dairy industry."

Wanted—A De-Packaging Machine

Among the things wanted by food processors is an automatic frankfurter skinner. This is wanted so badly, in fact, that the person or company that develops a successful machine is almost certainly assured of immediate business on a large scale.

Consumers demand huge quantities of the peeled franks, and meat packers are paying skinners a tidy sum daily.

So far no one has found a satisfactory way to perform this operation. Steel claws, compressed air and vacuum have been considered, but have not done the job. A seamed casing held together with temperature-sensitive adhesive has even been suggested. The idea is that the seam would hold during processing temperatures and then would be caused to let loose by application of a different and critical temperature, such as by cooling.

However the peeling is done, the product must not be damaged, and this precludes cutting off the ends, in event that occurs to you. Anyway, don't say we didn't tell you how you could get rich.

Pilfering Tips Packer to Quality

Amusing circumstances caused one food processor—let us call him Mr. A—to make a new dessert mix. Originally, Mr. A was packing a flavored mix, and some of it was being pilfered by his employees. Meanwhile, a second packer—Mr. B—developed a new mix. But Mr. B did not have the facilities to package the mix, so he arranged for Mr. A to do the job.

The pilferage in Mr. A's plant immediately shifted to the new mix and increased greatly. Now the significance of this was not lost on Mr. A. He realized that if his employees preferred the other packer's product, then his own must be inferior. So Mr. A decided to make the new mix. Fortunately, Mr. B did not care, for he was also in the business of selling one of the principal ingredients used in it. And when Mr. A put the new mix on the market, his sales skyrocketed.

Well, that's one way to get a good product.

Hors d'Oeuvres

■ Throw away the barbiturates for insomnia. A doctor in England, arrested for careless driving, said he was "under the influence of ice cream." Made him sleepy. The judge said £5.

■ A firm in India is looking for a formula for an edible lime paste to put on betel leaves. Be sure to mention FI when applying for the business.

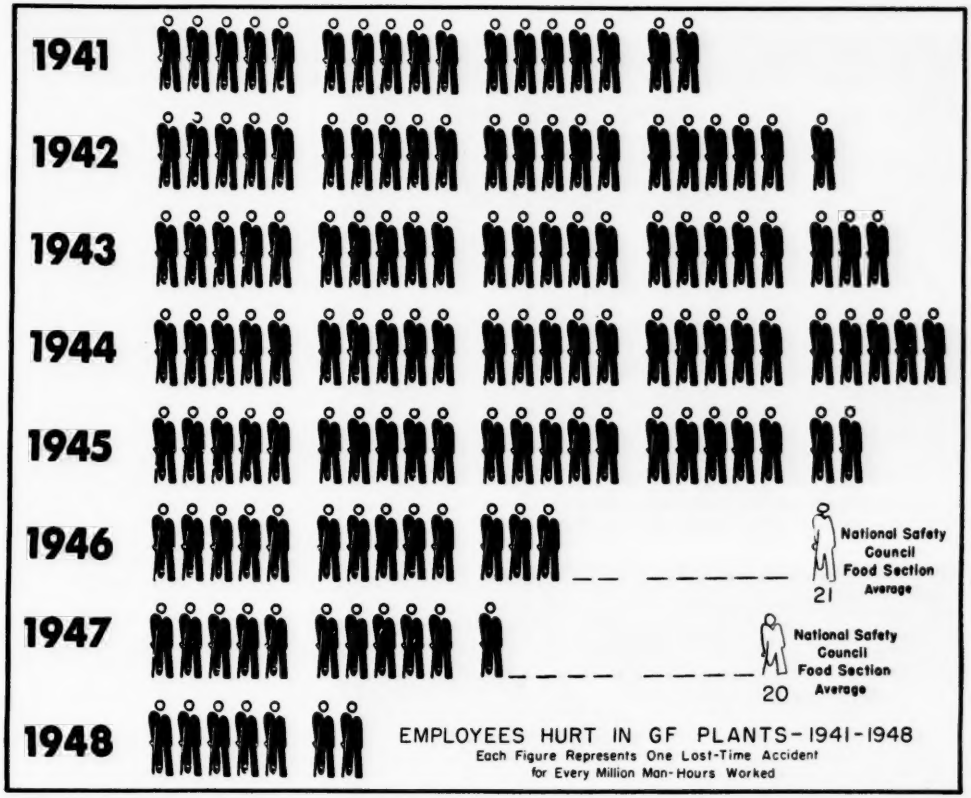
■ If you care for belated reports, we have one on another can of meat packed in 1824 and opened in England in 1938. Natcherly, it was well preserved and "found to be edible." Be nice to know what became of the one who found it to be edible.

■ Rutgers tells about a long-distance breeding trial in which two bulls in northern New Jersey became the fathers of 23 and 12 calves, respectively—in Italy. "It was a cooperative effort," says the school's release. "Taking part were the Agricultural Experiment Station, at Rutgers, The Institute of Artificial Breeding, at Milan, and UNRRA. Must have been quite a party.

■ Note for those trying to talk us into a depression: Estimated jobless in March, 3,200,000. That left only 60,800,000 working for the highest wages in history. Head for your lifeboat stations men, a spray just hit the deck.

■ You probably can't stand the suspense any longer, so here are the early bookings for May: Raisin Week, 8–14; Frozen Food Week, 14–21; Pickle Week, 20–28. And they are all national. No local stuff in this column.

J.A.J.J.



ACCIDENT RATE began to decrease in 1945 when GF introduced its safety program. A lost-time accident is defined as "any accident requiring attention of a doctor and which causes the injured one to stay off the job for any definite time subsequent to the day of the accident." As noted, accidents have been brought well under NSC average.

Safety Training Saves Company $1,000,000 Yearly

Finding most accidents are due to workers' unsafe acts, General Foods launched a broad program to make safety an employee habit. And it pays off handsomely

A 65 PERCENT drop in accidents in the last three years—as the result of a 3-yr.-old safety training program—has made plants of General Foods Corp. among the safest in the country. This is revealed by the National Safety Council, which presented awards to 14 GF plants last year.

During World War II, General Foods, like many other firms, suffered a new high in accident rates, due to wartime production problems. By 1944, the rate was 25 lost-time accidents for each million man-hours. This meant about 50 disabling injuries per month. In 1945, the rate was 22.

But since 1945, when an expanded safety training program was introduced, the rate has dropped significantly. In 1946 it was down to 13, in 1947 to 11—and last year it reached an all-time low of only 6.8.

Dollar savings resulting from this safety training are impressive. Savings of indirect costs (such as those caused by lost time and lost production) totaled $1,520,000 for '46, '47, and '48. In addition, savings on insurance premiums—already realized—are gauged at $695,000 cash.

Thus, $2,215,000 was saved in the first 3 yr. of the program, and each year now adds a million dollars to that saving. About $250,000 of this is in direct cash savings on lower insurance costs and $800,000 is in estimated savings on indirect costs.

How was this effective program launched in 1945? First off, it took careful planning and training. The firm's training division, under supervision of the vice-president for personnel administration, Thomas G. Spates, set out to examine all the facts.

From safety experts came the initial prime point: That unsafe acts of workers—and not unsafe physical conditions—constitute the main cause of accidents. Then a survey made in GF plants further disclosed that nearly 80 percent of the firm's accidents were

Billboards, Signposts, Slogans Sell Safety

BILLBOARDS are effectively used to highlight the success of the program. Here, day number is revised upward as record is maintained.

SERIES OF SIGNS along sidewalk leading into Maxwell House Division plant catches worker's eye with "Safety Thought For The Week."

These Terse Slogans—

have put punch into GF's accident-prevention program. To workers who write winning lines go tickets to sporting events, half-days off, and cash prizes. Popularity of contests has been high.

- **Keep Your Mind On Your Work and You'll Keep Your Fingers On Your Hands**
- **A Crutch May Support You—But It Won't Support Your Family**
- **Be Careful—Remember, There Are No Spare Parts For the Human Body**
- **Work To Be Skilled—Not To Be Killed**
- **An Ounce of Prevention Is Worth a Pound of Bandages**

the result of unsafe acts of workers. So faulty maintenance or housekeeping proved to be only a secondary target.

New Concept of Safety Training

The old way of dealing with accidents, by correcting conditions after the accidents have occurred, was thrown out the window. In its place came the new concept of dealing with accidents *before* they occur—by training people until they work safely from habit.

The company found that the following acts accounted for the majority of accidents: Taking an unsafe position, using unsafe equipment, and failing to use protective devices.

The Training Division then launched a "training-the-trainers" program by calling in representatives from every plant and putting them through a five-day Accident Prevention Institute. Here, these representatives learned how to stop accidents, then back at the plants they taught the supervisors —how to notice the sequence and types of accident causes, to record all unsafe acts and unsafe conditions, and to see that corrective actions were taken.

Positive Attitude

Through this training, the supervisors have developed a positive accident prevention attitude. They know that cutting down accidents brings about more efficient production and benefits the entire personnel of the plant.

At each plant, two types of monthly meetings are held on accident prevention. At one meeting, supervisors and the personnel manager get together and talk over what went wrong, why it went wrong, and what should be done about it. At the other gathering, the supervisors meet with their workers, who point out specific accident causes and give their views on how to eliminate those causes.

This worker participation has proved to be of extreme importance. For it is the workers' awareness of the accident problem and their desire to do something about it which makes the plant safer for all. At the meeting with their supervisors, they are asked for ideas on how to prevent accidents and are given the opportunity to recreate the situations which caused them, for graphic illustration.

Supervisor-worker meetings also devote considerable time to specific fundamentals of prevention. For example, the subject of lifting is attacked from all conceivable angles, with the supervisor and his employees working together on safe lifting procedures.

The workers, with their actual experience in lifting to guide them, and the supervisor, with a background of long periods of observation, draw up

a list of things to consider before lifting. They then pool their ideas on safe methods, and actually demonstrate how they go about lifting the objects with which they must deal from day to day.

There follows a critique period in which the workers are given opportunity to comment on the lifting methods illustrated. A National Safety Council film, *Safe Handling of Materials,* is finally shown to point up the lessons of the session. As the workers leave the meeting, they are handed take-away material illustrating correct lifting methods and explaining safe steps to take in lifting.

Held at regular intervals, these get-togethers are designed to sustain safety consciousness on the part of the workers—as well as to get their own ideas on accident-cause elimination.

Believing that health and safety go together, the company has attacked the problem of accident-proneness by getting straight to the source of trouble. Often an accident-prone worker is found to have something on his mind, such as a domestic problem. Or he may be suffering from some physical ailment. The supervisor talks things over with him and tries to help him.

Special Promotional Features

For added stimulation of worker participation in the program, plant personnel managers organize special features. These include slogan contests, encouraging of poster ideas, and publicizing of program results through such media as the bulletin board, large billboards outside the plants (as shown in photo), and display of safety flags on the plant flagpole as a token of accident-free months.

Recognition of each plant's achievements in combatting accidents is considered very important. Plants with outstanding safety records annually are presented bronze plaques bearing inscribed congratulations from the president and chairman of the corporation.

Plant Managers Furnish Ideas

Free rein is given to plant managers to spur the program, and many have come up with striking ideas. At the large Maxwell House plant in Hoboken, N. J., for example, a series of "Thought For The Week" sign posts (a la Burma Shave) were planted along the sidewalk leading into the plant. Typical was this series: "When lifting objects . . . There's a knack . . . Use your legs . . . Not your back" (see photo).

Plant newspapers aid by publicizing the program, while the *General Foods News Letter,* sent to all employees throughout the country, enables workers to see the results that have been achieved in other company plants.

The Bireley's plant in Hollywood, Calif., instituted the *Daily Safety Pill*—mimeographed tips presented to the workers. And distribution of *Safety-Grams,* printed on simulated telegram sheets, was one of the accident prevention methods used by Post Cereals in Battle Creek, Mich. and Diamond Crystal-Colonial Salt in St. Clair, Mich.

One of the most recent items employed in the company's overall program was the *Safety Analysis and Correction Check-List,* which was sent to all GF plant managers (see accompanying box).

With the worker now being assured that he stands to profit by cooperating with such an accident prevention program, the company is going ahead in the belief that accidents can be still further reduced.

The Maxwell House Tea Plant in Brooklyn hasn't had a lost-time accident in 3½ yr. And if the Brooklyn plant can do it, the firm believes that others can also.

Safety Analysis and Correction Check-List
(Sent to all GF plant managers)

If the safety record of certain foremen is bad, then—

☐ **Develop with foremen better methods for training hourly workers in accident prevention, using job breakdowns, job instruction principles, and reminders.**

☐ **Sell foremen on accident prevention by pointing out accident costs both to company and worker.**

☐ **Impress upon foremen that they are rated, among other things, on their success in accident prevention.**

☐ **Discuss with foremen the quality of their selection of causes and actions needed in their investigation of accidents.**

☐ **Review with foremen what they can do to strengthen accident prevention, such as holding short departmental meetings, setting good example, etc.**

If remedies used to eliminate accident causes show poor results, then—

☐ **Develop better remedies, such as training workers or eliminating unsafe conditions, to deal with specific weaknesses in the program.**

☐ **Have supervisors and workers develop remedies together.**

☐ **Improve selection, placement, induction, training and follow-up for new employees by developing a practical procedure with foremen.**

☐ **Check the possibility of transferring a worker.**

☐ **Discuss with accident-prone workers the reasons for it and what they can do to stop having accidents.**

☐ **Stimulate interest by using safety signboards, posters, bulletins, plant manager, letters, slogan contests, etc.**

If safety meetings fail to develop positive-action steps, then—

☐ **Review the safety organization, pointing out the part each member of supervision must play.**

☐ **Re-state the purpose of safety meetings. Plan meetings so they are constructive and interesting and deal with problems every one will want to help solve.**

☐ **Develop discussion outlines to deal with things that can be done to strengthen accident prevention.**

If inspectors' safety recommendations are not being approved or completed then—

☐ **Develop, with the aid of supervision, a training procedure for inspectors, so that they may know what to look for, and so their recommendations will be more worthwhile.**

☐ **Work out with supervision a step-by-step procedure for acting upon these recommendations to assure proper elimination of accident causes.**

WHAT-TO-DO tipsheet for managers, with squares for pencil-checking items.

EXTERIOR view of the elevator showing the open roof floors, steel storage and headhouse bins.

MOVEMENT of materials to and through the elevator is controlled from this central switchboard.

Pushbutton Panel Controls

New flour mill's advanced equipment and design improve efficiency, eliminate explosion hazards, and facilitate sanitation. Pneumatic conveyors employed.

C. R. HAVIGHORST
Associate Editor, "Food Industries"

Advanced-concept building design, processing, and control by instrumentation—heretofore not incorporated in flour mills—are embodied in the new ultramodern facility recently put into operation by General Mills, Inc., in Los Angeles, Calif.

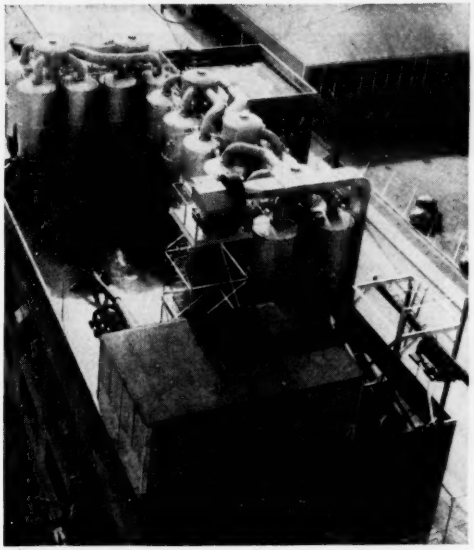
Intricate, interlocking electrical systems and instrument controls for air, steam, water and gas are provided throughout the elevator, mill and packaging departments. Remote controls at strategic locations operate these systems.

Although this mill will manufacture approximately 3,200 cwt. of flour daily, the company looks upon it as a pilot plant from which other progressive developments in flour milling will originate.

The elevator is unique in that the exposed roof, steel

ADVANCED FOOD PLANT ENGINEERING
24th of a Series

ENCLOSED weatherproof distribution conveyors above bins permit the use of open type floors.



PIPING, cyclones and tanks of the pneumatic system are exposed on roof of the mill building.

Operations in Ultramodern Plant

storage and headhouse bins have replaced conventional concrete structures having "Texas" floors. The bin top floors are "open air"—that is the enclosed weatherproof distribution conveyors above storage and headhouse bins are out in the open—no roof or walls.

The headhouse is comprised of a separate group of steel tanks adjoining the steel storage tanks. Remote controlled, pneumatic slidegates and electrical interlocked systems control the grain flow.

Inert gas blanketing of these bins, an entirely new innovation, makes this elevator dust-proof as well as explosion-proof and provides a means for further research in the storage and conditioning of grain for milling.

The smut-house, or mill-wheat cleaning house, is a three-story and roof-floor building adjacent to the elevator and separate from the mill building. New features here include electrical interlocks for equipment and bin-eye controls. In addition, instruments control the application of heat, steam, hot or cold water and inert gas to wheat. There are also automatic controls for air measurement, which adjust automatically for air control of machinery such as aspirators, mill separators, stoners, scourers and cooling towers.

Solids are reclaimed from the chlorinated water used in the wheat washer, by a flotation-clarification process.

The four-story concrete mill building has a roof-floor. This building is separate from the tempering house and packaging building. Bulk flour storage adjoins the mill building. Careful planning, newly designed equipment, and new processes make possible this type of layout.

As in the elevator and mill-wheat tempering house, electrical inter-locks, bin eyes and instrument controls reduce the human element of error and some of the "rule of thumb" practices that have been used in flour mills. Pneumatic handling of mill separates eliminates the conventional bucket-elevators and screw-conveyors. These innovations result in a completely new profile throughout the various mill floors.

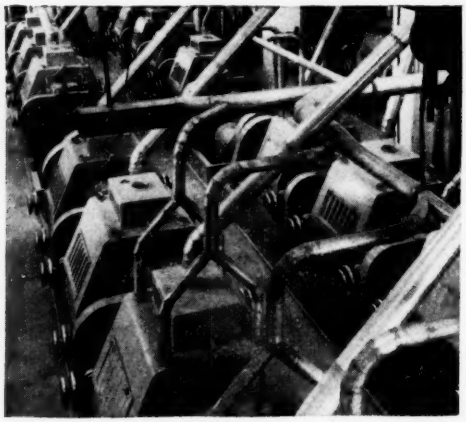
Separates from rolls to sifters and flour from sifters to bleachers are handled pneumatically, as well as mill feeds from dusters to feed mill and cut-in flour to mill flour for stuffed grades. The air tempering system provides the air necessary to replace that drawn from the mill by the pneumatic handling system. The latter is equipped with dust collectors. Bulk flour storage blending enroute to the packers is controlled from either the flour mill or package building by remote stations. The packaging department and laboratory are housed in a 1½ story concrete and steel building.

Grain is unloaded from rail cars by the first commercial

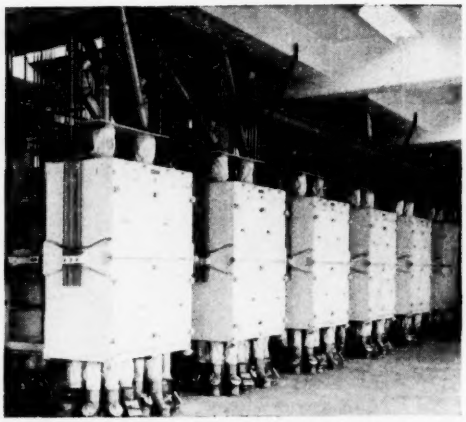
Engineering Features of the New Plant Include—

Steel storage bins
Distribution conveyors in the open
Headhouse comprised of steel bins
Inert gas blanketing of bins
Remote controlled slide gates
Pneumatic conveyors
Electrically interlocked systems
Bulk blending by remote control
One man box car unloader
Electronically controlled scales
Instrument controlled utilities
Vari-drive sifters
Automatic feeders to battery rolls
"No ledge" design throughout
All metal purifiers
Pressurized air in mill building
Windows flush with walls
Walls coved at floors

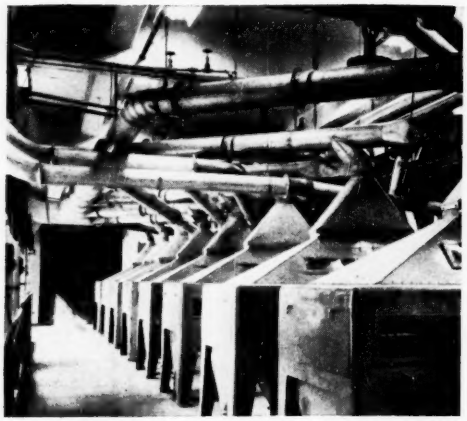
Sanitation Featured in New Roller Mills, Sifters, Purifiers and Conveyors



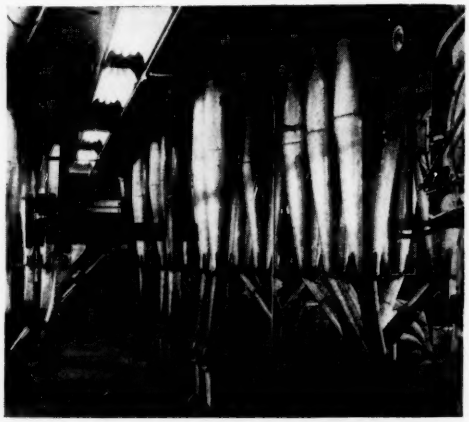
CLEANLINESS on the roller floor is greatly aided by the smooth contours of these modern mills.



FREE-SWINGING sifters suspended from the ceiling gyrate in perfect circles. Gyration is adjustable.



ALL METAL purifiers have simplified, cloth-cleaning devices and hoppers replacing conveyors.



MATERIALS are withdrawn from collector cyclones in pneumatic conveying system, through these air locks.

installation of the box-car "pantograph unloader," a semi-automatic machine requiring only one man to operate it. An entirely new automatic, electronically controlled weighing scale prints each draft and records incoming grain as well as that which is transferred within the house. Scalping of incoming grain is done by a newly designed "pit" vibrator scalper.

The grain is routed through spouting by electrical interlocks which are controlled from the scale room. There is no possibility of mixing the grain in transit with this system.

The grain is tempered and conditioned through the application of heat, steam, air and hot water, all of which are measured and controlled by automatic controls. Evaporative cooling in towers assures meeting of the moisture and temperature requirements for the first break rolls. Dry-cleaning of the wheat is done with stoners, milling separators, disk machines, Entoleters and scourers. All screenings are pneumatically handled. The battery rolls have automatic feeders and roll gage controls.

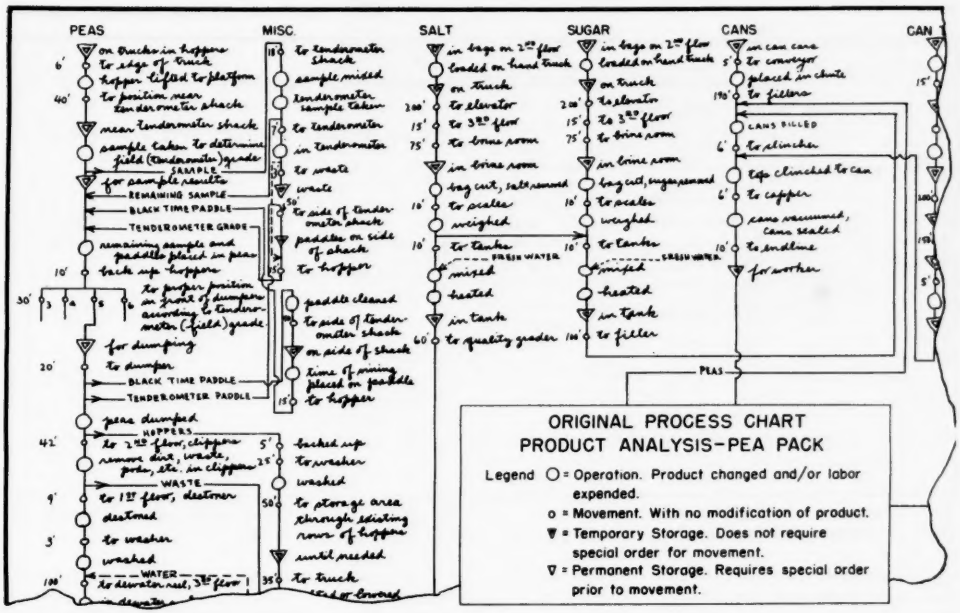
The equipment in the flour mill, other than the pneumatic handling system, is rounded out with a new series of vari-drive sifters, all metal purifiers, finishers, power scales, agitators, and Entoleters. Flexible operation and compact arrangement of equipment is accomplished by the use of unit drives, eliminating line shafting and flat belts.

Continuous scale readings on the movement of wheat and production of flour, mill feeds and screenings contribute to more efficient milling by having yield results always at hand.

The packaging and bagging department is entirely mechanized. Bags are conveyed to a central palletizing station, where warehousing or carloading on pallets completes the operation.

Emphasis was placed on sanitation in the design of this new mill. Pressurizing of the mill building tends to keep outside dirt from filtering in. Cleaning is done by vacuum, with stationary outlets throughout the building to facilitate this work.

Construction and equipment is of the "no ledges", no "false hoppers" design and type. Windows are flush with walls; walls are coved at floors; bins have no false hoppers or space that might create bug harbors; and there are no bucket elevators or reels.


PEAS
MISC.
SALT
SUGAR
CANS
CAN
ORIGINAL PROCESS CHART
PRODUCT ANALYSIS—PEA PACK
Legend ○ = Operation. Product changed and/or labor expended.
o = Movement. With no modification of product.
▼ = Temporary Storage. Does not require special order for movement.
▽ = Permanent Storage. Requires special order prior to movement.

This symbolical study demonstrates how . . .

Industrial Engineering Cuts Labor, Time, Handling

Applied by special chart, system will improve cannery job by eliminating two-man task, reducing product-travel, cutting truck stations, and correcting in-plant traffic

GERALD NADLER
Instructor in Industrial Engineering, Purdue University, Lafayette, Ind.

Application of the principles of industrial engineering to a receiving problem in a midwest cannery will bring numerous operational advantages over the old method of handling vegetable hoppers.

Advantages of the new method:

1. Elimination of the difficulty in unloading the hoppers from the trucks because of the uphill pull. In the original method, two men were sometimes required to pull a hopper off the truck.

2. Reduction of the number of unloading positions from six to three, thereby aiding the unloading platform crew.

3. It will not be necessary to roll hoppers to an out-of-the-way position to be graded.

4. No backing away from the grading positions will be necessary.

5. The circular pattern of flow eliminates the confusion and conflict in moving hoppers around on the platform.

6. The average distance traveled by a hopper will be 25-35 ft. less per trip than the original method, saving wear and tear on the hoppers and reducing the amount of pushing and pulling of hoppers by the unloading platform crew.

What Is Involved?

Many people, when the subject is first presented, ask, "Just what is industrial engineering?" And frankly this question is rather difficult to answer. Industrial engineering classifies a type of endeavor, yet does not really explain the function of that endeavor. It utilizes scientific principles for investigating and improving industrial operating procedures. This definition specifies not only operations already in use, but includes any future operations. Fundamentally, industrial engineering can benefit any industry.

There is still a huge task remaining in even those industries which have introduced scientific management, for mere introduction doesn't automatically sell it to all the skeptics and nonbelievers in the organizations. For those companies without industrial engineering, and for the skeptics, perhaps a few illustrations of industrial engineering improvements in the operating effectiveness of a canning plant would aid in the selling process.

Of all the scientific knowledge used, motion and time study is the most basic. This type of study is a scientific means of analyzing work of any nature to increase the productivity per man-hour by eliminating waste effort. Almost every other division or function of industrial engineering relies on motion and time study fundamentals. Some beginning analysis technics will be reviewed and an application given from the canning industry.

The author was employed by the midwest canner as an industrial engineer during the pea and corn season, and all examples given here represent the methods worked out to cope with a particular problem of this plant. It is to be noted, however, that the

Old method of handling hoppers

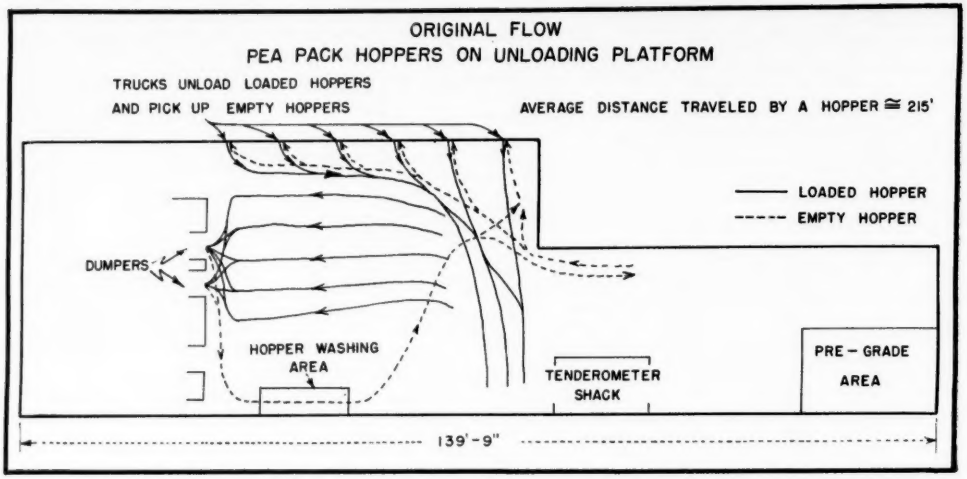


FIG. 1. TRACED here on cannery floor plan, routes traveled by pea pack hoppers graphically indicated the several points of traffic congestion—putting the spotlight on inefficiencies requiring correction.

technic by which the solution was found would be the same for any food plant.

The first step in any industrial engineering program should be the making of a graphic presentation of what happens, from the arrival of raw material until the product is shipped. Further, the presentation should contain all other information affecting the product. This presentation is called a process chart-product analysis; it portrays the individual steps required to change and to transport the raw material into the final desired product.

These individual steps or operations demonstrate that something has been done at a particular location to modify or change the product, or that labor is expended. Altogether, the process chart-product analysis shows the operations, the movements from operation to operation, and the delays of the product.

The chart is then an aid in determining the points at which work can be done to improve operations, provide for better transportation or moving of the product, design better equipment, experiment to determine the value of proposed changes for waste control, and so forth.

This chart also becomes an aid in obtaining the best layout of equipment in any future change of machinery, workplace locations, or building. Through use of the chart, undesirable long-distance traveling by the product, which is a source of possible damage, may be avoided, and the time the product is in the plant can be reduced to a minimum.

To maintain a degree of standardization in charts, symbols are selected to portray a particular type of activity.

This new method was charted

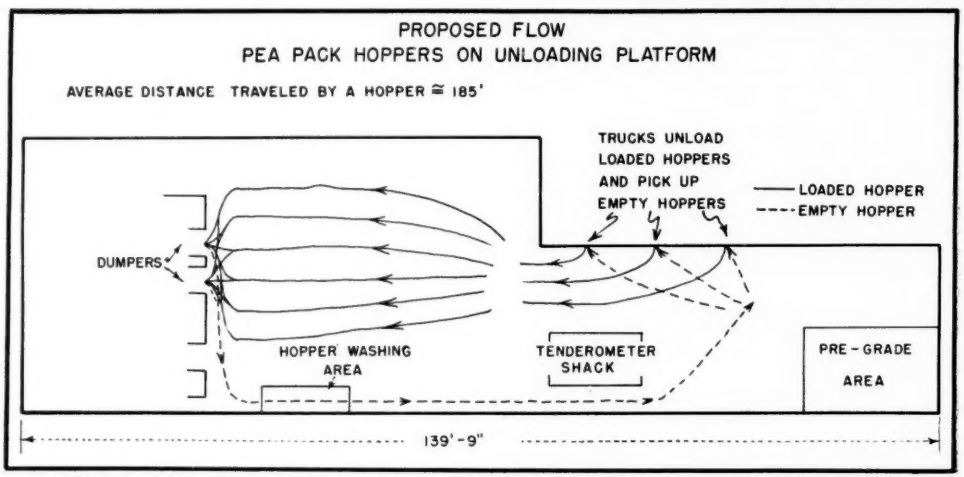


FIG. 2. ROUTES worked out for new, efficient travel of the hoppers eliminate all awkward cross traffic and simplify movements to achieve a logical materials handling sequence. Reduction in travel is evident.

lacked organization

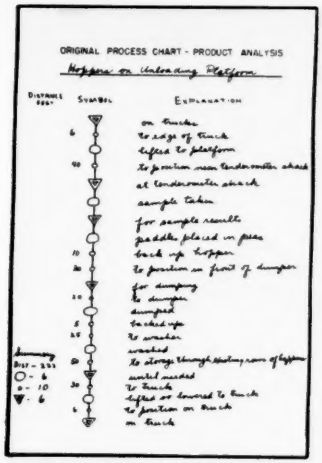


FIG. 1A. THIS symbol chart provided a break-down of old method.

These symbols are standard throughout the country. A portion of the original process chart-product analysis of the pea pack is shown in the chart at the beginning of this article, and a legend is included which names the symbols and gives their meaning.

Notice that the different components necessary for the completion of the final product are traced in separate columns until they are ready for use. Observe how each symbol clarifies what takes place, and how the movement-distances show excessive travel.

For instance, the first symbol in the "peas" column indicates that the peas are in "temporary storage" in hoppers on the truck. The hoppers are removed from the trucks to the platform, an average distance of 45 ft. Samples are taken from each hopper (notice that the peas are not changed, but that labor is expended at this point) and the samples are taken to the tenderometer shack while the hoppers remain in "temporary storage" awaiting the results of the tenderometer test. There should be no trouble in following the process the rest of the way.

Along with a process chart-product analysis, a flow diagram should be made—to follow the product through the plant—by means of lines drawn on floor plans of the factory.

Moreover, this diagram is invaluable in another way: It helps find the troubles indicated by remarks on the process chart, which may indicate that excess waste occurs at a particular point, or that something exists to make a particular operation or movement difficult.

So that we do not become too involved in drawings and diagrams, a simple example may serve to illustrate this analysis technic.

As mentioned before, the peas come to the plant in hoppers on trucks. For the short example, a process chart-product analysis is shown for the "hoppers" that carry the peas. This original flow diagram of the hoppers is shown in Fig. 1, and the original process chart in Fig. 1A.

The present method of receiving, dumping, washing, and removal of the hoppers is as follows: The trucks loaded with hoppers filled with shelled peas back up to one of the six general unloading stations along the unloading platform. The hoppers are rolled off the truck with the truck floors seldom parallel to the plane of the platform; also the truck is usually so located in relation to the platform that the hoppers must be pulled uphill and lifted or lowered to the platform.

Backing-Up Wastes Time

Then the hopper is rolled to a position near the tenderometer shack and placed with its wheels at right angles to the direction of entry to the dumper. Here, the hopper remains until the tenderometer grade is determined, at which time the hopper is moved to its proper tenderometer position in front of the dumpers. This involves backing up the hoppers and then rolling forward so that the direction of the wheels is parallel to the line of entry to the dumpers.

After the peas are dumped, the hopper is backed out, rolled to the hopper washer, and left under the water until the next hopper is brought to the washer. The washed hopper is then rolled to the storage area, passing between the rows of loaded hoppers, awaiting tenderometer grading or dumping. As they are needed, the washed hoppers are rolled to the trucks from the storage area.

The condition of uphill and out-of-line truck floors in relation to the platform makes it necessary to lift the hoppers onto the trucks.

After completion of the process and flow charts, check-list[1] questions to improve chart-product analysis were applied to find a solution to the trouble spots as mentioned above, as pointed out on the process chart, and as became evident on the flow diagram.

Since we are presently interested only in showing what can be done with motion and time study technics, no attempt will be made to point out the thinking processes involved. The proposed flow diagram and process chart are shown in Fig. 2 and Fig. 2A, respectively.

to save time and labor

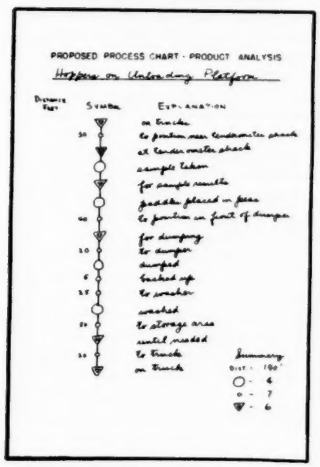


FIG. 2A. CHART of new system quickly indicates handling savings.

Arrange New Flow

Hoppers are now to be unloaded in that half of the former stage area which is closest to the dumpers. The ground in front of this new unloading dock was graded[2] so that a truck floor will be even with the loading platform.

Room for only three trucks to unload is provided, since the dispatching of trucks calls for one truck to report to the unloading dock every five minutes, with more than two trucks reporting at one time representing a very unusual case. Hoppers will be removed from the truck and rolled to a position near the tenderometer shack, with the wheels facing parallel to the direction of entry to the dumpers.

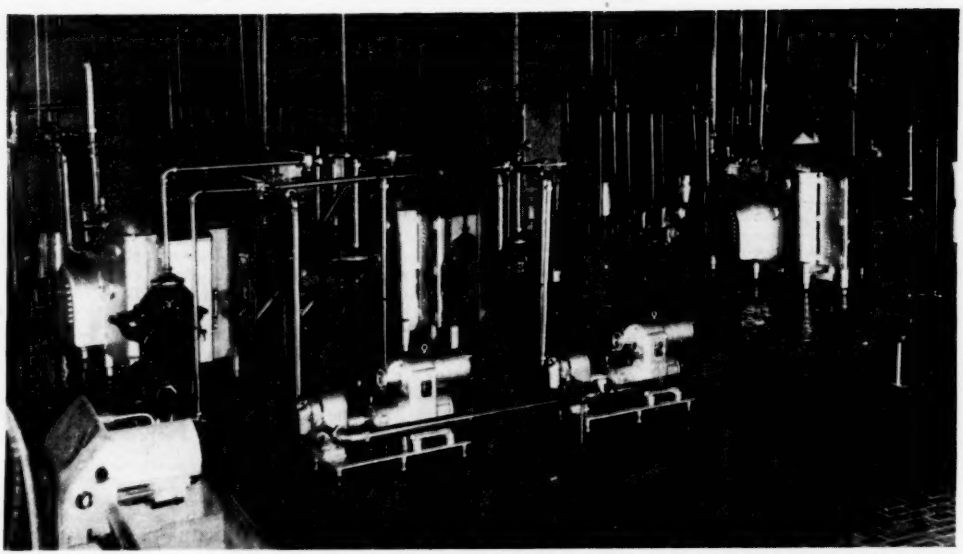
The hoppers from the trucks are to be lined up according to unloading positions of the truck—i.e., the truck closest to the dumpers has its hoppers placed in a straight line nearest the edge of the platform, the truck second in line parallel to the first straight line, but closer to the tenderometer shack, and so on. After the determination of the tenderometer grade, the hoppers will move to the proper position on the platform in front of the dumpers.

After the hoppers are pushed to the dumpers and unloaded, they are to be backed out and pushed to the washer. From the washer they will move in a straight line behind the tenderometer shack to the storage area near the pre-graded area. From this storage area the hoppers will roll to the waiting trucks as needed.

[1] For further reference, see M. E. Mundel, *Systematic Motion and Time Study*, Prentice-Hall, New York, 1947, p. 31.

[2] Grading of road along platform had already been arranged, therefore will not incur any excessive expense in introducing the new method.

This advanced layout was the answer . . .



HIGH MILK DEMAND is met without overtime by these four new pasteurizing lines at Sheffield Jamaica, L. I., plant.

Modernization Ups Food-Plant Output to 155 Percent

Dairy's elimination of holder-type pasteurizers, rearrangement of filling room, and enlargement of storage box were prime factors. Operating costs also lowered

A. V. GEMMILL
Assistant Editor, "Food Industries"

By judicious revisions in plant and equipment, Sheffield Farms at Jamaica, Long Island, is today handling 280,000 qt. of milk daily in a plant originally designed for 180,000 qt. Night operation has been eliminated, and running time has been materially reduced. Unit labor costs are lower, and the daylight operation has greatly improved employee morale.

Modernization was the answer—modernization which took into account improvements in equipment, processing, and materials handling, and modernization which considered the changes in distribution resulting from expanding wholesale volume since the plant was constructed in 1938.

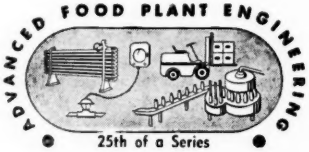
Let us tell the story from the beginning:

When the plant was originally designed, the business was largely composed of home service routes. The small amount of store business was serviced from retail trucks. Transports were loaded for delivery to distributing center throughout Long Island and Brooklyn.

While the increase in wholesale and store business, particularly the development of supermarkets, a new type of delivery was introduced. Seven different items in milk alone were added. Operations became more involved, and more costly.

Rehandling of cases in the cooler and stacking rooms increased man-hours enormously. Then, too, different labeling requirements for New York City and Nassau County required frequent shutdowns of production lines.

Homogenized milk, not produced in 1937, now represents over 80 percent of the milk handled. Two-quart glass bottles and 1-qt. paper containers are largely used, in addition to the regular 1-qt. glass bottles.

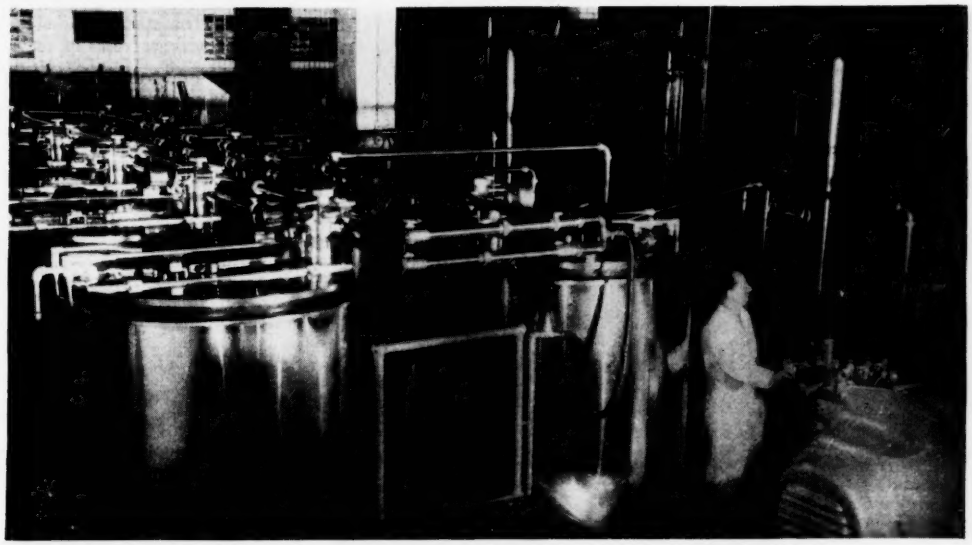


As a result of the changing character of the milk business throughout its territory, Sheffield Farms, in 1945, named a three-member planning committee to devote its entire time to a study of the operations at the company's New York and New Jersey plants. It was to make recommendations for a program of modernization of buildings and equipment which would cut costs and provide more efficient service for the expanding territory. The committee was composed of a production executive (chairman) and two men from the company's engineering department—an engineer and a draftsman.

The Jamaica plant was the first to be investigated by the committee. Plans for its modernization were completed and changes in equipment and layout started over a year ago. Results of these changes are already apparent. Incidentally, they were made without a single day's interruption in the normal plant operations.

When completed, this plant will be one of the finest in the country. And it should be able to compete favorably with any plant of similar size in

. . . when this set-up failed to meet the demand



LONG HOURS, with consequent high costs, were required when this holder-type system was operated over capacity.

efficiency, operating and distribution costs. As stated, it is already operating at fully 155 percent of the original design capacity.

Building Well Engineered

The Jamaica plant has four stories above the street level, together with a basement. All processing is carried out on the 3d floor. Bottle washing and filling operations are performed on the 2nd floor. The first floor contains the bottled milk storage and loading facilities for retail delivery trucks. In the basement, returned bottles and cases are stored, and wholesale trucks are loaded.

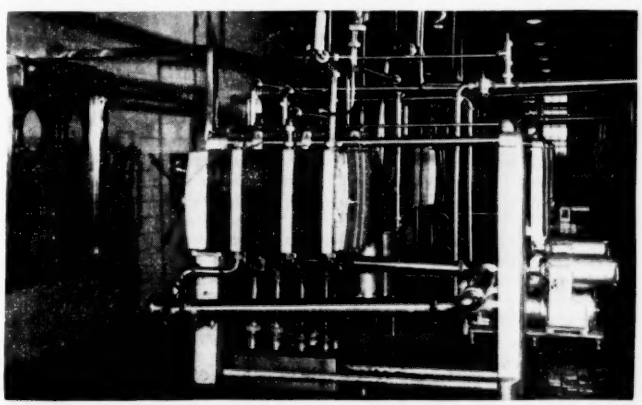
Luckily, the engineering department, in planning the building, had made provision for necessary changes in equipment and operations. Partitions had been eliminated wherever possible, giving large areas that would lend themselves to added equipment. Columns were well spaced; floor drains and pipe lines were centered at columns. Materials had been selected that would stand up well under the conditions that prevail in milk plants. Two entire floors—the pasteurizing and bottling floors—have finished walls of glazed tile. The floors were laid with red paving bricks. Ceilings are of smooth concrete cast in plywood forms, thus eliminating plastering.

Changes in Pasteurizing Room

When the plant was completed in 1937, raw milk storage facilities consisted of four 4,400-gal. horizontal stainless steel tanks located in the 3d floor pasteurizing room. Two 4,400-gal. weigh tanks in the 1st-floor receiving room were also available for storage. This made a total storage capacity of 26,400 gal. Pasteurization equipment consisted of two parallel regeneration type surface heaters; seven 550-gal. holding tanks, and two parallel regeneration coolers.

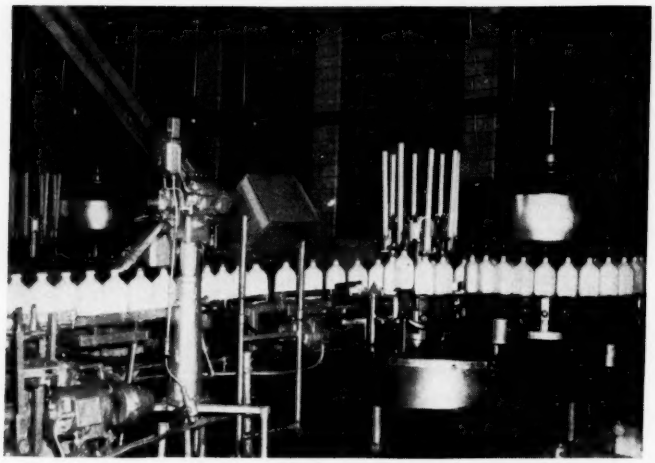
During the past twelve years, high-temperature short-time pasteurization with its many operating economies, has become the accepted method. Then, too, homogenized milk, not produced at Jamaica in 1937, has grown in popularity, to where it represents more than 80 percent of today's volume. The large number of different products handled, together with different labeling requirements for New York and Nassau County, involved numerous shutdowns in the bottling operations.

To meet these changed conditions, the holding tanks, heaters and coolers were removed, raw milk storage capacity was increased to 50,000 gal., and four 2,000-gal.-per-hr. plate units, each connected with a 2,000-gph. homogenizer, were installed. There are now four completely separate process-



ABOVE UNIT was pacemaker. High-temperature short-time plate pasteurizers removed bottlenecks, reduced man-hours and product losses, greatly increased production capacity. Four of these units were installed.

Other Key Units Which Sparked Improved Operation



FLEXIBILITY was added, shut-downs reduced with such units as this combination 1- and 2-qt. glass bottle filler.

PRODUCT QUALITY and working conditions were improved when draftless cold air from diffusers in the ceiling of milk storage replaced blowers.

ing lines, each with a capacity of 2,000 gal. of milk per hr. Three balance tanks —two 420-gal. and one 400-gal.—receive the cooled milk from the short-time units and feed the fillers on the floor below.

This arrangement makes possible the processing of several types of milk simultaneously. Other advantages: Greatly increased capacity without an increase in floor space, and a reduction in operating and labor costs.

To provide an enclosed space for the HTST controls and water heating units, a narrow room was constructed between the pasteurizing and byproducts rooms. This was done by building a new wall in the byproducts room. Control panels were installed in the original wall between the two rooms.

Another engineering change associated with the setup was the installation of a 4,000-gal. sweet water tank on the 4th floor directly above the HTST units. Sweet water is cooled by direct expansion in a tank on the 1st floor of the plant. It is pumped to the tank on the 4th floor and flows from there to the cooling sections of the HTST units and back to the 1st floor tank.

Bottling Room Changes

In the original plant, separate bottling rooms were provided for the pasteurized milk and byproducts. And bottle washers were installed to feed the different fillers most conveniently. Since the filling rooms were at right angles to each other, the washers were placed likewise. Also, one washer was used to supply the two fillers in the byproducts bottling room.

As a result of the planned study, all glass filling operations are to be performed in the original pasteurized milk bottling room. Filling of paper containers will be at the extreme end of this room. The room previously used for byproduct filling will become a paper bottle storage. Bottle washers will be installed in a straight line which will greatly simplify the entire bottling operation.

As a first step in this modernization, a new soaker type bottle washer, that will wash either 1- or 2-qt. glass bottles, has already been installed.

Cooler Enlarged

Increasing the production capacity of the plant necessitated expansion of bottled milk storage space and refrigeration facilities. The old box, with an area of approximately 5,000 sq. ft. was enlarged to practically double that size. To obtain this additional space, other plant changes were necessary.

The receiving room, which was located on the first floor adjacent to the railroad siding, occupied a part of the needed space. To make this space available, the two 4,400-gal. weigh tanks and scales were moved to the 3d floor pasteurizing room. Milk pumps from the receiving room were moved into a smaller room at the outer edge of the building. Incidentally, when the plant was built in 1937 a large part of the milk was received in railroad tank cars. Now the entire amount is received by tank trucks, and the new receiving room is much closer to the truck unloading area than the former room.

The old box was cooled by three floor-type blower units operated with brine. These units, having all prime surface coils, delivered 28,000 cu. ft. of air per min., and required 30 tons of refrigeration.

Chilled air from the blowers discharged through a system of slotted sheet metal ducts, suspended from the ceiling within the box. This arrangement produced drafts that were objectionable to employees working in the room. As a result, the blowers were shut off much of the time. This increased the refrigeration required to maintain the desired temperature and insure the quality of the stored products. The brine units had to be shut off manually for defrosting.

The new box, which is considered one of the largest and most efficient in the dairy industry, has an area of approxi-

mately 9,000 sq. ft. Cooling is done by five floor-type blower units installed in a separate room. These have fin coils and are operated on a flooded ammonia system. They deliver 62,500 cu. ft. of air per min. and require 90 tons of refrigeration.

Design conditions were based on total storage capacity of 18,000 cases of milk. Refrigeration was calculated on cooling the product to 42 deg. F. and maintaining the same ambient temperature during the period from 7 a.m. to 6 p.m. while the box was being filled. This temperature is reduced to 35 deg. from 6 p.m. until midnight, when the box is closed and all lights and conveyor motors are shut off. At midnight, the box is opened for the removal of products to the truck-loading points via conveyors.

Air at 25 deg. F. is distributed through ten insulated metal ducts installed over the top of the box (see Fig. 1). Each duct has six type AR Anemostats (a total of 60) extending through the ceiling, and mounted flush with it. These give equal and draftless distribution of air throughout the entire box.

Each blower unit is provided with a liquid float, and an individual back pressure valve equipped with a solenoid valve. These valves are controlled by thermostats located in the return air stream. The thermostats are set to open the solenoid valves at 35 deg. F. and close them at 38 deg. The blower fans operate continuously.

Hot Gas Defrosting

Each unit has a hot gas defrosting cycle. Experience has shown, however, that much of the defrosting is accomplished when units are shut off by the thermostats. Occasionally, units are removed from service for several hours for a complete defrosting.

A recording thermometer installed in the cooling unit room has its thermal bulb located so as to record the mean average temperature of the box.

The addition to the box was built to match existing construction. Cork in the floor, walls and ceiling is 4 in. Membrane waterproofing was used in the floor, below and on top of the cork. Structural facing tile is used on walls to the ceiling. Mastic finish is employed on walls in the blower room. Tile (4 x 8 x 1¾ in.) is used on the floor. The ceiling cork was applied to a wood-hung ceiling made of Wolmanized lumber.

All doors are insulated with 4 in. of corkboard. Conveyor doors are vertical sliding, cut to contours for a tight fit when closed. Lights are placed directly over conveyor lines.

Cases of filled bottles are carried from the second floor filling room to the

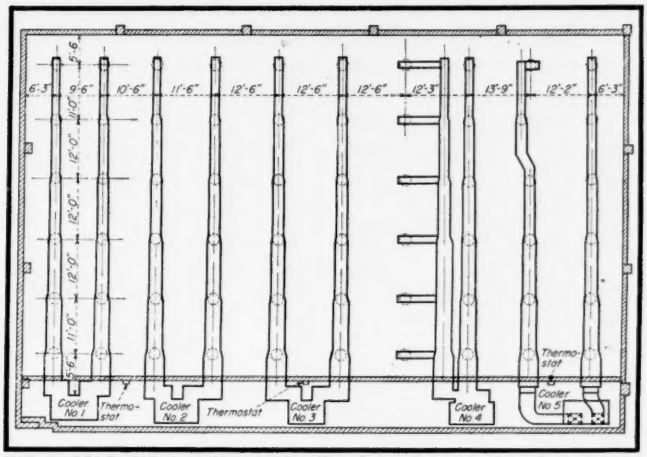


FIG. 1 COLD AIR is uniformly distributed to all parts of product storage by insulated ducts above the ceiling. Cooling units are in separate room.

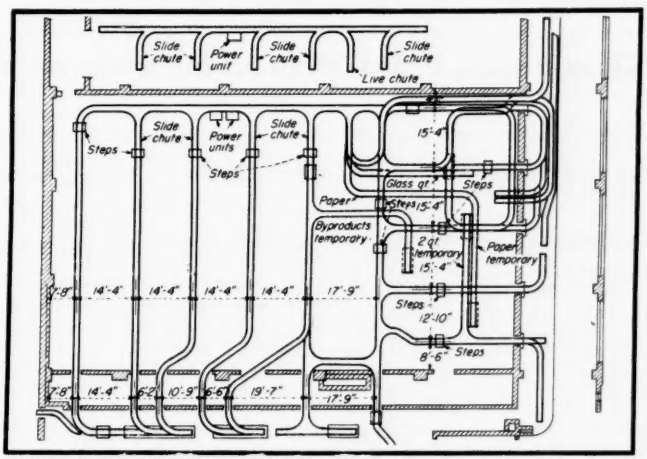


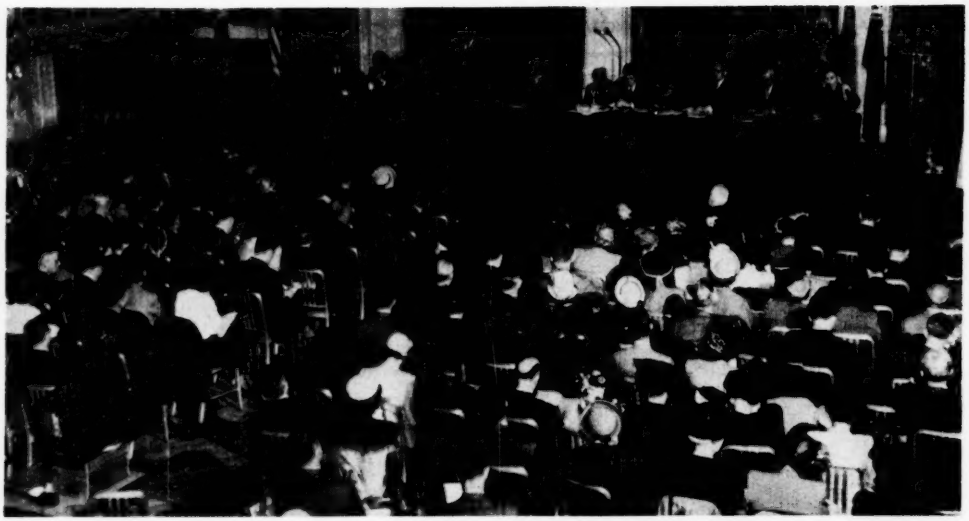
FIG. 2 POWER CONVEYORS distribute filled cases to all parts of milk storage room, greatly reducing handling of cases from filling room and in truck loading.

first floor storage box by means of power driven chain conveyors. At present, the box is served by four Lowerators, temporarily connected to the new conveyor system in the box. When filling room changes have been completed, three Lowerators will feed cases to a double-decked header at the rear of the new box. (See Fig. 2)

From the header, the cases are distributed to separate retail and wholesale storage areas within the box. In the retail area, five lines lead out to the platform to serve six retail loading positions on the first floor. The wholesale area consists of five branch lines running through the box and utilizing the retail header as a sixth line to feed six Lowerators to the wholesale loading platform in the basement. At this platform, the six lines branch out to form eight loading positions, the sixth Lowerator feeding three positions for trailer loading.

Retail return cases are unloaded on the first floor and conveyed by Lowerators to the basement case stacking area. Wholesale return cases are unloaded at the basement loading platform. Both retail and wholesale cases are stacked in one common area in the basement.

From this area, the cases of bottles are conveyed by escalators to the 2nd floor bottle washing room, where they are separately washed, filled and returned to the bottled milk storage on the 1st floor.



MEDICAL SCIENTISTS, at meeting in New York, discuss results of recent nutritional surveys in Newfoundland and their implications in regard to public health in the United States, Canada and other areas. Meeting was held April 4.

Discoveries Point Way to Nutritional Advances

Promising new vitamins found—one significantly containing a mineral. Also pertinent to food field are deficiency-fighting factors in trace elements and amino acids

CHARLES GLENN KING
Scientific Director,
Nutrition Foundation, Inc., New York City

Developments in nutrition during the past two years—which the food processor should be interested in appraising—reflect notable progress in the fields of vitamins, trace elements, halides, amino acids, and related materials.

It is important, therefore, for food technologists to keep abreast of the science of nutrition, and be reliably informed concerning the composition of their company's raw materials and their prospects of new and proper uses. The less diligent will be confused, perhaps, by each new discovery. But in contrast, the more competent leaders will be in a position to serve the public and their respective employers more efficiently and more fully as a result of the progress.

New Vitamins

Last year, folic acid (vitamin B_c) was conspicuous as a newly identified member of the vitamin B complex family. This year we have witnessed the appearance of vitamin B_{12}, and more recently vitamins B_{13} and B_{14}. The compositions of the latter three remain unknown or undisclosed at this time. In the case of folic acid, however, there is now a chemical method for measuring the vitamin, and it can be assayed biologically by the use of animals or bacteria.

Folic acid and vitamin B_{12} are related in function, and they may be found together in natural products such as liver and lean meats. Apparently vitamin B_{14}, too, is related to folic acid in molecular structure and biological function.*

Folic acid continues to be recognized as an unstable but widely distributed nutrient, particularly in such products as green leafy foods, fresh fruits and liver. Its chief functional role as a basis for human use, beyond being essential for growth, has been in protecting against specific types of anemia that are characterized by large red blood cells. Increased susceptibility to intestinal infections is also characteristic of deficiencies in man and in test animals.

Sprue and related forms of anemia respond quickly and satisfactorily in most cases when folic acid is supplied by feeding. However, patients with pernicious anemia show only temporary improvement with folic acid therapy. There follows, in most cases, an onset of neurological disturbances indicative of injury to the central nervous system.

Vitamin B_{12}, generally administered by injections, is immediately effective in the treatment of pernicious anemia. Further investigation is required, however, to unravel the relationships between folic acid and vitamin B_{12}. The newest member of the group, vitamin B_{14}, is reported to cure a form of anemia commonly associated with folic acid deficiency. It appears to be chemically related to the natural coloring matter, xanthopterin.

There is likelihood that the food processor will, within the next two years, be paying considerable attention to the amounts of B_{12}, B_{13} and B_{14} in his products.

Trace Elements

The disclosed presence of cobalt in vitamin B_{12} has excited researchers. For apparently we finally have an example of special nutritional significance attached to a mineral element as a result of its being combined in organic form. During the past decades, there have been many claims for or-

* *Science* 32-3, Jan. 14, 1949.

ganic forms of mineral elements such as phosphorus and iron, but none of the former claims has stood up under investigation. The special values, if any, had always turned out to be the result of accompanying materials.

Four of the trace elements have become intimately related to the general problem of nutritional anemia in experimental animals and livestock. A basic requirement of iron and a supplementary intake of about 1/10th as much copper has long been recognized. Iron deficiencies have been recognized as of common occurrence among the human population, but copper deficiencies are very seldom recognized.

About the only evidence that we have in regard to human health betterment as a result of providing copper is based upon more rapid recovery from anemia when copper was added to milk in feeding tests with infants.

Yet a great many instances have been reported, particularly in the past decade, in which deficiencies of iron, copper, cobalt and manganese were responsible for impaired health of livestock when feed had been restricted to local pasturage. Generally, the animals have exhibited anemia as one of the dominant symptoms, accompanied by intestinal disturbances, weakness and loss of weight. Often there were neurological disturbances as well.

A further chapter has been added to the trace element story by the finding that in some areas (as in Florida), where molybdenum salts have been added to the soil as a fertilizer ingredient essential to good crop production, the forage crops could accumulate enough of it to become toxic. When quantities of copper well above the normal requirement were fed, however, the toxic effect of the molybdenum was corrected. Apparently, there is normally a balance between these elements.

Although a considerable amount of propaganda has been released relative to the healthful effects that the trace minerals, copper, cobalt, manganese, zinc and molybdenum may have upon humans in areas where the soil is deficient in these elements, there is almost no reliable evidence to justify the claims that have been made. There is, however, information of a thoroughly reliable nature to support the recommendation of practically all nutritional scientists that a human diet should include a generous quantity of green, leafy foods.

This provision, if adequate, probably would cover requirements of the other trace elements, granting, however, that there is need for careful research in this area of subject matter.

Iodized Salt

The situation is different in the case of iodine. Deficiencies in it have been recognized through several decades as contributing, in a serious degree, to impaired human health, as well as constituting a serious problem in livestock feeding. Emphasis upon the value of iodized salt for human and livestock population in large sections of the U. S. is based upon excellent evidence and deserves more attention that the subject is currently receiving.

The reason is a slackening in educational support of iodized salt. This is unfortunate, for nearly all medical and non-medical nutrition scientists who are familiar with the evidence strongly support legislative action to achieve more uniform distribution and use of iodized salt. Manufacturers of salt have largely solved the related technical problems.

There appears to be serious need for a joint approach to the problem on the part of salt manufacturers, public health officials, research men familiar with scientific literature, and public officials who are concerned broadly with problems of food supplies and health. Out of such deliberations should come practical accomplishments in the public interest, with little occasion for opposition. Considered steps should be taken, however, to safeguard the products offered the public, and especially to avoid creating conditions that would handicap the use of salt in food processes such as canning.

Author King Considers Salient Roles of—

- **Halides in nutrition**
- **Calcium intake and anti-calcification factors**
- **Tryptophane in pellagra**
- **Choline as an agent in hypertension and tumors**
- **Nutritional levels in maternal and child health**
- **"Non-essentials" in proper diets**

Fluorides

In the case of another halide, fluorine, an optimum intake can afford a significant degree of protection against tooth decay or dental caries. Topical (surface) applications of fluorides, under conditions that will involve a minimum of risk of fluoride poisoning, can also exert a significant degree of protection against dental caries in children. Provision of fluorides will not solve the entire problem, however.

There is still an abundance of evidence that good nutrition, in a broad, complete sense constitutes a sound basis for lowering the incidence of tooth decay. There are many factors involved, including several minerals, several vitamins and a good supply of protein. Local factors, such as ratio between sugars and fats should also be recognized. And salivary activity varies greatly from individual to individual.

Unfortunately, there is a tendency for investigators familiar with a very limited field of study to overemphasize some one phase of the problem of tooth decay, with the result that the public and scientific professions tend to become confused.

Calcium Intake

Another subject of current discussion is the intake of calcium. The Food & Nutrition Board of the National Research Council recommended this year that the adult calcium intake be increased by 20 percent. The recommendation was based upon very careful appraisal of the evidence at hand.

There is no question in the minds of nutrition scientists concerning the fact that a large fraction of the world's population has lived in a reasonably good state of health despite a calcium intake distinctly lower than that recommended by the board. But recognition of this fact should not stand in the way of working toward a reasonable goal based upon optimum nutrition. In practical terms, most medical nutritionists and dieticians agree that adults who consume approximately 1 pint of milk per day, and a diet that is otherwise of reasonably good quality, would achieve a calcium intake of 1 gram per day as recommended.

One aspect of the problem that is often overlooked by individuals who are critical of the recommendation, is the number of factors that work against maximum efficiency in utilizing the calcium in a given food supply.

For example, intake of vitamins D, A and C has a direct bearing upon calcium utilization. An adequate phosphorus intake, and a normal balance of other mineral ions, such as magnesium, sodium and potassium, may exert a marked effect upon calcium utilization. Foods that supply an abundance of available calcium are almost certain to receive increased consideration in the immediate future—and perhaps permanently.

There is, accordingly, a resultant emphasis on milk as a protective food, either as consumed directly or as incorporated into other foodstuffs such as bread. The use of calcium phosphate in leavening agents and ready-mix bakery goods is receiving recommendation on the basis of calcium content.

Occasionally, too, one hears a suggestion to incorporate calcium salts in table salt, together with iodine, but there is little pressure in that direction.

While most studies of calcium are concerned with deficiencies, a relatively

new area of concern deals with food as a protective agent against excessive and abnormal deposits of the mineral. Calcification of the soft tissues and at the ends of the long bones, accompanied by varying degrees of joint stiffness, as reported originally by Dr. Wulzen and her associates at Oregon State College, has been studied by some of the pharmaceutical laboratories and at Cornell University.

There is no doubt of the reality of a dietary fault as described by Dr. Wulzen. A good diet prevents this inflammation in guinea pigs, but recent findings give less emphasis to joint stiffness as a scientific feature of the deficiency. Current interest is focused upon the nature of the disturbance in calcium deposition.

Proteins and Amino Acids

More will be known about adult amino acid requirements when Dr. W. C. Rose reports his findings—probably this year. Preliminary papers are available, indicating a requirement of eight amino acids in the usual sense of defining the word essential, in contrast to the albino rat's requirements of ten amino acids.

Whether an amino acid plays an essential or a non-essential role, depends, in some instances, upon the intake of other amino acids and the demand for growth. An important aspect of recent work is concerned with the critical importance of timing as a factor in controlling the efficiency with which individual amino acids are used. Protein foods apparently are digested at a rate that facilitates their use, in contrast to what may occur when preformed amino acids are fed or supplied by intravenous feeding. One does not hear so many extravagant claims as formerly on behalf of the protein hydrolysates.

For intravenous feeding and other comparable special uses, there will be a continuing and valid demand for amino acid hydrolysates and synthetic products. The great advances in methods of measuring amino acids in micro quantities, together with new discoveries of their role in enzymic processes, makes it natural that research scientists are working enthusiastically on amino acid requirements, functions and commercial uses. This work is likely to continue.

It is not always possible to differentiate the groups of accessory factors sharply. Preliminary identification of vitamin B_{12} as an animal protein factor for example is an important development, which links two kinds of factors together. Addition of vitamin B_{12} to the diet is not intended as a substitute for essential amino acids. But as B_{12} becomes available in the form of concentrates to supplement low-quality, vegetable protein foods and feed, an advantage will result for these commodities as compared to the more expensive animal protein foods and fats.

Pellagra

Another instance of the interrelationship between amino acid content and vitamin content is a newer knowledge of pellagra which indicates that tryptophane is at least as important as niacin. In the study of nutritional problems related to pellagra, it is interesting to note the sequence of relationships that were discovered. The first major break was recognition, by Dr. Goldberger and his associates, that pellagra is a deficiency disease—a lack of such foods as meat, milk and eggs.

The next step was the discovery, by Dr. Elvehjem and his associates, that niacin deficiency was primarily responsible for the gross symptoms associated with the disease. Within a few years it became increasingly apparent that low quality protein, long associated with the disease in an empirical way, could be explained in terms of a deficiency of the amino acid tryptophane.

More recent study of vitamin B_6 deficiency made it clear that this vitamin controls, to a major degree, the normal metabolic use of tryptophane. Therefore, a second vitamin had to be given consideration in estimating the antipellagra value of foods. Continuation of experimental animals on the diet used to induce pellagra, may also result in symptoms of folic acid deficiency. Thus, both folic acid and vitamin B_{12} were added to the group of nutrients concerned with pellagra.

From the point of view of food technology, it is worth noting that tryptophane is one of the less stable amino acids, and that it is more characteristic of animal than of plant protein sources. Vitamin B_6 and folic acid are among the less-stable nutrients in the vitamin group.

One may also note that the symptoms indicating deficiency of these nutrients tend to develop in chronic rather than acute forms. We are still far from having an adequate appraisal (in terms of human health) of the intermediate levels of intake of these nutrients, (in the zone barely above an intake that will prevent pellagra).

Non-Essential Nutrients

Nutrients such as pectins, polyphenols, cellulose, fats and non-essential amino acids may, despite their optional nature, prove advantageous in the diet. They need not be classified as either vitamins or significant sources of energy. Under specific conditions, these nutrients can make a contribution to normal physiology, irrespective of whether these products can be termed essential.

In other words, evidence is accumulating to justify the viewpoint that many organic materials in common foods may provide a safety factor in regard to health, although not strictly required. In this sense, they are truly accessory factors, though not to be confused with vitamins, which are commonly designated by this term.

Public Health Aspects

Choline has been studied intensively in several laboratories during recent years, from the point of view of normal functions and in terms of its possible importance for the protection of public health. In the latter field, findings of wide interest in relation to hypertension have come from Dr. C. H. Best and his associates, and in relation to cancer from Dr. W. D. Salmon and his associates.

In a paper given before the New York Academy of Medicine recently, Dr. Best of Toronto described experiments with albino rats in which short periods of choline deficiency, covering only a few days, followed by prolonged generous feeding, led gradually to the development of changes that closely resembled typical human hypertension and arteriosclerosis.

This demonstration of an initial and apparently slight injury leading prematurely to degenerative diseases merits careful consideration. It appears to afford the type of clue that clinical and animal investigators have been searching for in their approach to many problems in human and animal health. How many food manufacturers are concerned with the choline content of their commodities?

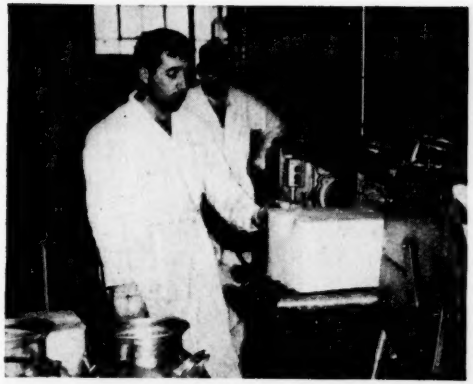
There is another approach to the problem of hypertension in the so-called rice diet, which appears to have reasonably good support as a temporary measure to accomplish lowering of blood pressure. Reasons for the gain are not entirely clear; presumably an important factor is the decreased caloric intake, and a second factor is the extremely low salt intake. A further practical advantage is the blandness of the flavor of rice, making it possible for people to eat enough to avoid severe starvation but without any temptation to overeat.

A danger inherent in this therapeutic system is the risk of inducing deficiencies of essential nutrients when patients are maintained on such a restricted diet through long periods.

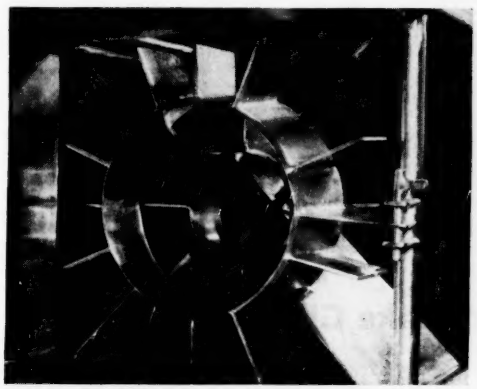
Tumors

Some of the accessory factors are now being considered in relation to the growth of tumors. In experimental

(*Turn to page* 203)



1 CAKE OF FROZEN BUTTER goes direct from storage, unthawed, into chamber of comminutor.



2 THEN THESE FIXED KNIVES, inside unit, cut butter when piston pushes it forward.

3 AND BROKEN-UP BUTTER falls from cutters and slides down chute into mix pasteurizer.

Unthawed Frozen Products Now Quickly Comminuted

New unit cuts food blocks—frozen dairy products, eggs, fruits, and like—into pieces for further processing. Uses also seen with non-frozen commodities

Frozen products such as cream, butter, condensed milk and eggs, may now be incorporated into an ice cream mix without previous thawing.

This is accomplished by means of a newly developed hydraulic comminuting machine equipped with stationary knives. This equipment is now used in plants of Borden's and National Dairy, to prepare frozen cream and butter for ice cream mixes, and frozen cream for butter making.

Designed to reduce these frozen products to sizes that will not damage thermometers and agitators in pasteurizers, the unit will eliminate oiling-off of fat, and insure complete melting before pasteurizing temperature is reached.

In addition, the machine will cut up certain other non-frozen products (such as cheese) into pieces small enough to permit pulverizing in a standard comminuting unit.

Three essential elements comprise the new unit: A stationary knife assembly; a cylinder into which the product to be comminuted is placed, and a reciprocating piston which forces the product through the knives.

All parts of the unit that come into contact with food products are of stainless steel and designed for easy cleaning. For example, the cutting assembly (center photo, left) may be completely disassembled by removing one pin.

The cylinder is 14½ in. square and 23 in. long. It will handle products in sizes up to 14½ x 14½ x 16 in. A hinged door on the side of the cylinder opens downward to provide a shelf upon which the product to be comminuted is placed, before it is pushed into the cylinder. The piston, which has a 16 in. stroke, is operated by a hydraulic ram.

The hydraulic pump, together with its 3 hp. motor, oil reservoir, automatic valves and controls, is mounted in the base of the machine, enclosed in stainless steel.

After removal from its container, the frozen product is first placed on the shelf-door of the cylinder, then pushed inside between the piston and the knife assembly. Next, the cylinder door is closed and securely fastened, then the operator presses the starter button, which causes the piston to force the frozen product through the cutting knives.

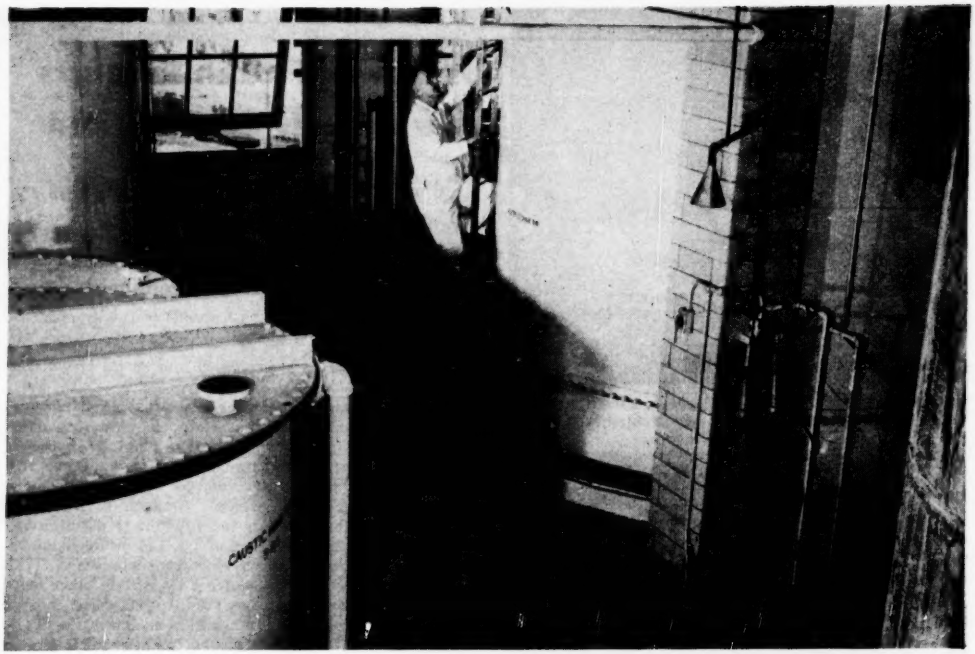
When all of the material has been forced into the knives, the piston returns to its original position and stops.

Eight seconds are required for the forward stroke of the piston, and four seconds for the return stroke. This gives the machine a capacity of as much as 20,000 lb. per hour.

Sizes of the comminuted pieces are approximately 2 x 3 in. in cross section, with the length depending upon the temperature and the characteristics of the material. Length varies from 2 to 3 in., in the case of very hard, cold products, to the length of the original piece when the product is soft.

The machine is mounted on ball-bearing wheels so that it may be moved close to the pasteurizers. In this way, the comminuted products drop directly into the other ingredients as they are being heated.

Maker of the new hydraulic comminuting machine is Bryant Machinery Co. of Montclair, N. J.



STORAGE TANKS for dried protein materials and chemicals are located on the 5th floor of the new Staley glutamate plant. From here they are **gravity-fed to weigh hoppers and measuring tanks, then to processing.**

Corn Proteins Now Utilized To Make Glutamate

Process that Staley developed after 17 years of laboratory and engineering research uses wet-milling byproducts, hydrochloric acid, and alkali

WALTER G. MEYER
Process Development Director,
A. E. Staley Manufacturing Co., Decatur, Ill.

After laboratory research and pilot plant experimentation dating back to 1931, A. E. Staley Manufacturing Co. has recently put into operation a new $2,500,000 plant for manufacture of monosodium glutamate at Decatur, Ill.

This plant symbolizes the patience and persistence often essential to carrying a food processing idea through to commercial application, or a new product to successful production.

In this instance, the studies and tests, carried on during the preliminary development period, involved problems involving processing methods, materials of construction, and operating procedures.

Glutamate Values Well Known

The product itself was not new when the company, in 1931, became interested in the possibilities of its production. Glutamic acid, the parent product, was isolated and identified as early as 1866. Glutamate's enhancing effect upon flavor was observed about 1900. Commercial production from wheat gluten started in Japan about 1910. By about 1920, production had greatly increased in Japan and China, and importation into the United States began under the trade name of "Aji-No-Moto".

Chief source materials for its production included dried, powdered seaweed and wheat gluten. During the 1920's production was started in the United States, and Steffens waste, from beet sugar manufacture, became a source material. At present, the manufacture of glutamate is so firmly established in this country, after numerous processing difficulties, that the United States is the largest producer in the world.

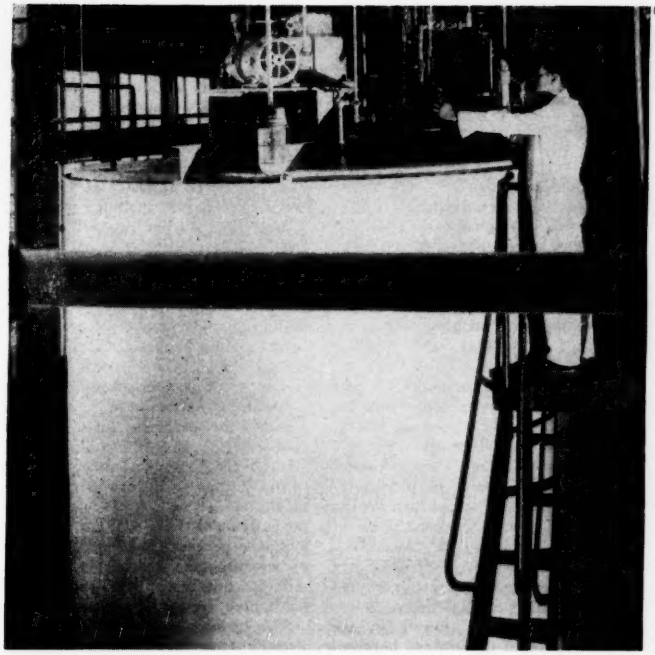
Staley's interest in glutamate production was stimulated by the availability of large quantities of vegetable protein from the company's normal corn-refining operations. Potential utilization of these proteins meant development of a suitable and commercially feasible processing method.

Hydrochloride Process

Initial steps, in both laboratory research and pilot plant, centered on the so-called hydrochloride process by which glutamate was made from seaweed and wheat gluten. This method proved to be unsatisfactory, particularly from the economic viewpoint. The yields were low, and the process was extremely difficult to control.

Also, the highly corrosive nature of the processing ingredients presented many obstacles, mostly concerned with materials of construction. For these reasons, construction of a commercial plant was postponed.

Laboratory research and pilot plant development work were continued, however, in order to make chemical and engineering improvements in the



FINAL CRYSTALLIZATION of glutamate takes place in agitator equipped tanks of this type. Process is partly continuous, partly batch.

process. And by 1940, a new process had been developed, based on controlled hydrolysis with concentrated hydrochloric acid. Also, a large-scale pilot plant was put into operation to determine the efficiency of the process.

This pilot plant was operated successfully until 1942, when material and equipment shortages, due to wartime conditions, resulted in a curtailment of its operations. The project was then revived during the latter part of 1945, and steps were taken for the building of a plant. Late in 1948, the new structure was completed at a cost of $2,500,000.

In designing and equipping the new plant, much time and effort were spent in the search for and testing of materials of construction. Since the heart of the process is the hydrolysis step, consisting of the digestion of vegetable protein in a concentrated hydrochloric acid solution, the corrosive action of this acid must be considered.

Tricky Operation

The process itself is not complicated, but its actual control is very difficult. Digestion of the protein (byproducts of the company's main operation) is accomplished under reflux at atmospheric pressure in 15 to 20 hr., or it may be carried out at elevated temperatures and pressures in about 4 hr.

The resultant hydrolysate is diluted preliminary to neutralization of the excess acid. After cooling to the predetermined temperature, the neutralized hydrolysate is filtered in rubber-lined presses. Choice of alkali used depends upon how the waste materials are to be disposed of, or how the salt produced by the neutralization is to be used elsewhere in the company's normal operations. At present, Na_2CO_3 and NaOH are used interchangeably, depending upon availability.

After neutralization, the humin, or carbonaceous solids material, is removed by press filtration, and is thoroughly washed. Press washes are recycled and used to dilute the hydrolysate of the following batch.

The filtrate contains a mixture of amino acids, including the desired glutamic acid. It is concentrated to the point of incipient crystallization of the inorganic chloride formed by neutralization of the excess hydrochloric acid. Several amino acids, particularly tyrosine and leucine, crystallize when the concentrated solution is cooled, permitting them to be recovered by filtration on rotary suction filters.

Inorganic Salts Removed

Again, the filtrate is concentrated to a point at which enough inorganic salts precipitate to curb interference with subsequent crystallization of glutamic acid. The inorganic salts are removed by filtration and washed.

Resulting is a filtrate that contains the glutamic acid, residual inorganic salts, and other amino acids. It is cooled to a predetermined temperature, and the pH is adjusted to the iso-electric point of glutamic acid. Crystallization from this adjusted solution requires from 4 to 8 days, depending upon the glutamic acid content and the amount that can be removed economically.

The higher the protein content of the material fed into the digester, the smaller the volume of the mother liquor at time of crystallization and the greater the yield of glutamic acid per gallon of liquor.

Glutamic Acid Decolorized

Separation of the crude glutamic acid from the mother liquor is accomplished by centrifuging. The recovered product is washed thoroughly to simplify the subsequent purification and crystallization of the monosodium salt. Washes are recycled, and the glutamic acid is mixed with water preparatory to neutralization with NaOH to form a saturated solution of monosodium salt. This is decolorized by treatment with activated carbon. The carbon is removed by press filtering, then the clear solution is ready for the crystallization step. The carbon cake is washed thoroughly and the washes are recycled.

Crystallization of Staley's monosodium glutamate from its water solution is accomplished by a method carefully controlled to obtain a clean, white, end-product. Last traces of moisture are removed in a rotary drier before the glutamate goes to the packaging room to be put into 1-, 10-, 50-, and 100-lb. packages. The three smaller size packages are for restaurant, hotel and institution use.

Certain prime factors in the process and plant operations can be emphasized: (1) Use of rotary driers, (2) need for positive control over corrosion, process operations, and sanitation, and (3) avoidance of contamination.

Use of two rotary driers tells a large part of Staley's glutamate success story. One is used to dry the protein material from the wet milling operations to a predetermined moisture content before it is fed into the digesters. This drier is 45 ft. long and 6 ft. in

Special Fold-Out Picture-Flowsheet Of Staley's Operation Is Presented on Pages 124-127

dia. It has an operating capacity of approximately 1 ton per hour and is filled to capacity most of the time.

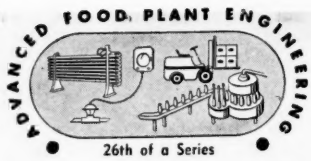
In comparison, the other drier is small—6 ft. long and of 12 in. dia.—with a production capacity of only 200 lb. of finished glutamate per hour.

Because tons of raw materials go into the process and only pounds of the finished product come out, the chances for losses are great. These losses, although low in percentage of the voluminous byproduct cakes and liquors, cause an immediate and large decrease in yield. Factors like these, plus the consideration that amino acids are very tricky to separate, make the over-all operation of the plant very difficult and necessitate positive control over both the process and the operations. It is imperative that the process be completely "bottled up" to obtain sufficiently high yields to make the operation economically sound.

It's a "Blind" Operation

The foregoing statement means that a great amount of chemical engineering is involved in the Staley process. There is no quick way to analyze quantitatively for glutamic acid. The process therefore, must be carried through "blind," without any determination of actual yields until the final product is ready to be packaged.

Possible exception to this broad statement is that the glutamic acid content of the concentrated filtrate can be calculated from the amount of NaOH required to adjust its pH to the isoelectric point. This exception is questionable, however, because truly accurate determination of probable



yields is impossible until a week or ten days after the raw material is fed into the process. Automatic controls are required in certain phases of the plant operation, and exceptionally close supervision is necessary in all others in order to obtain the highest possible yield of monosodium glutamate.

Corrosion Protection

Another chemical engineering aspect of the process is the aforesaid need for positive control over corrosion. Recent improvements in structural materials have contributed largely to the success of the process. The amino acid solutions, at the pH under which the process must be carried out, present corrosion problems in themselves. Various stainless steels (particularly 316) can be used in some places and for valves and pumps.

Conditions which prevail in the major portion of the process, however, are so corrosive that Haveg, carbon and rubber-lined equipment are necessary. These requirements present problems in design of special equipment. Further complications result from the temperature and pressure limits of the plant operation.

Control of corrosion also has involved plant sanitation. Pipes, ceilings and equipment supports require coating with acid-proof paint to hold corrosion in check and to facilitate cleaning. Other safeguards were taken in the new plant to meet the most stringent sanitation regulations applying to food materials. Salt-glaze tile was used throughout the building to permit easy cleaning. All the equipment was designed and installed to provide ease of access to and around the units to permit thorough cleaning.

Protection of the product is provided by having floor openings for conveyors and pipes sealed against leakage of wash water and the like. All process tanks are covered to exclude potential contamination. The drying and packaging of the glutamate are performed in a separate sanitized area to avoid contamination.

These precautions have been found necessary to obtain and maintain production of a white crystalline glutamate of the highest possible quality.

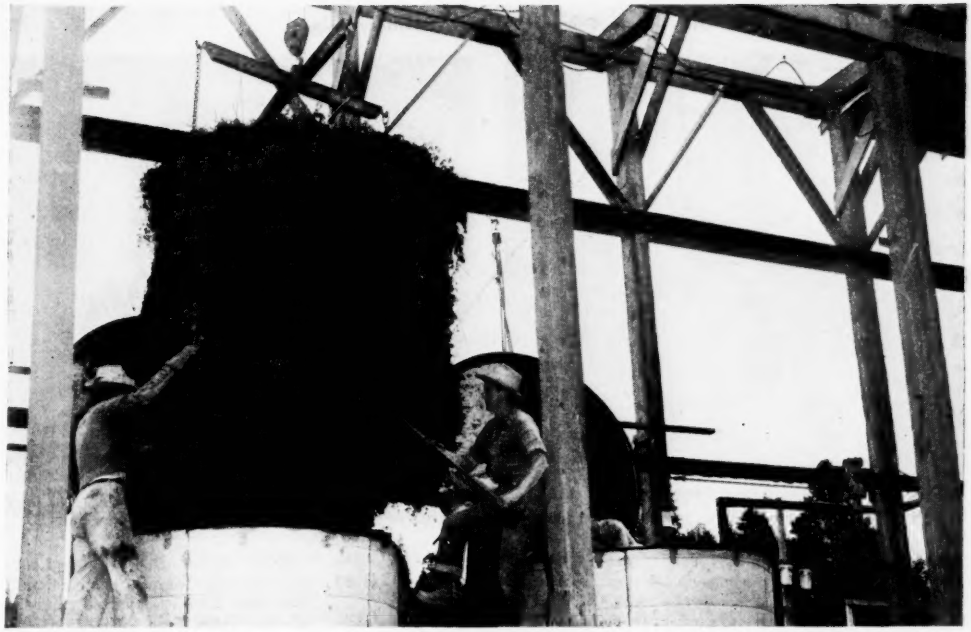
The company's researches and pilot plant studies have not stopped with the building of this new plant. Almost any new process like this production of monosodium glutamate from wet-milling byproducts provides many new substances for further investigation.

The tyrosine and leucine fractions present many interesting possibilities, in that they are obtainable relatively free from inorganic salts. Methionine and phenylalanine are present in recoverable quantities.

And although the mother liquor from the glutamic acid separation step contains a high concentration of inorganic salts, it is nevertheless a rich source material for several amino acids, including proline and aspartic acid.

NEW five-story $2,500,000 monosodium glutamate plant of A. E. Staley Mfg. Co. Materials move up and down inside the building during processing.

MANHOISTS transport employees between floors of the new plant.



PEPPERMINT HAY is "charged" into preliminary field still. Two to three tons of hay will yield about 50 lb. of oil.

New Type Still Improves Quality of Peppermint Oil

Separation of intermediate fractions is accomplished for first time commercially by continuous unit with capacity exceeding 2,400 lb. of oil daily

RAY BLOOMBERG

Northwest Correspondent, "Food Industries"

A continuous fractionating still—the only one of its kind to be used for refining peppermint oil—gives greater refinement of the crude oil, more precise isolation of fractions, and better control over the quality of the final product.

The 50-ft.-high still was recently put into operation in the new $250,000 plant of the I. P. Callison & Sons, Chehalis, Wash., the second largest producer of this oil. It was specifically designed and manufactured to rectify the natural oil and thereby meet the exacting requirements of the confectionery, pharmaceutical, and other manufacturers.

Most important single advantage of this type of still is its capacity for concentrating and isolating certain minute fractions of the oil. This is possible only because of a very high reflux ratio that can be maintained without impairing the efficiency of the still.

This new still combines the flexibility and scope of laboratory equipment with the efficiency and economy of the large-scale commercial rectifying units. Use of relatively low temperatures avoids thermal decomposition and retains the natural flavor and odor of the peppermint oil.

Details of the Process

Capacity of the still exceeds 2,400 lb. of oil per day. It replaces the smaller pot stills that the company had used since entering the peppermint oil business in 1943. Previously the company dealt in cascara bark, digitalis, berberis, and other botanicals used by the pharmaceutical industry.

The peppermint crop is mature at full bloom. It is cut like hay and allowed to wilt in the field. In one to four days, it loses about 30 percent of its moisture. Then it is picked up by hay loaders or pitched on trucks and transported to the grower's field stills or "tubs."

These tubs hold about 1½ tons of hay. In shape, they are round (8 ft. in dia. at the top, 7½ ft. in dia. at bottom, and about 8 ft. high). As they are filled, the peppermint is compressed to make a compact charge.

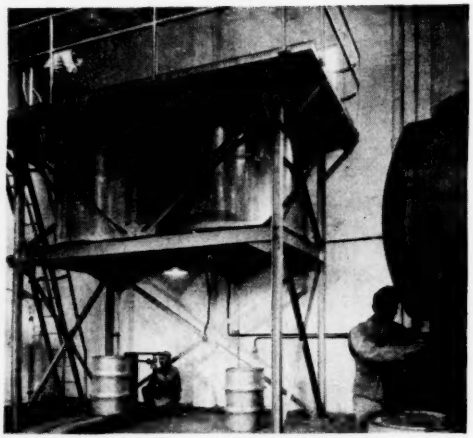
The tub is then sealed, whereupon moist steam, supplied from an oil-fired boiler, is introduced at the bottom of the tub through a perforated pipe. Filtering up through the leaves, the steam volatilizes the peppermint oil. The oil vapors, together with the steam, escape from the tub through a pipe at the top leading to a condenser and thence to a decanter. The oil rises to the top of the decanter, and it is periodically drawn off. Approximately two to three tons of peppermint hay produce 50 lb. of the crude peppermint oil.

Sampling Oils From Growers

During the season's peak, the company operates daily truck service to pick up oil in the heavily producing areas. In other regions, the company's field men send the full drums to local

CAMERA FOLLOWS THE OIL—From Grower Through Refinery →

1 **GROWER FILLS** 50-gal. metal drums with the natural peppermint oil. Drums will be trucked to the refinery.



2 **OIL** is taken (left) from blending tanks (top) and weighed in drum. Storage tank is seen at right.

receiving stations, or growers ship them to the refinery by commercial trucks.

Attached to each drum is a card bearing the grower's name and the growing region. The contents of each drum are analyzed by the laboratory for esters, menthols, etc., also for taste and odor.

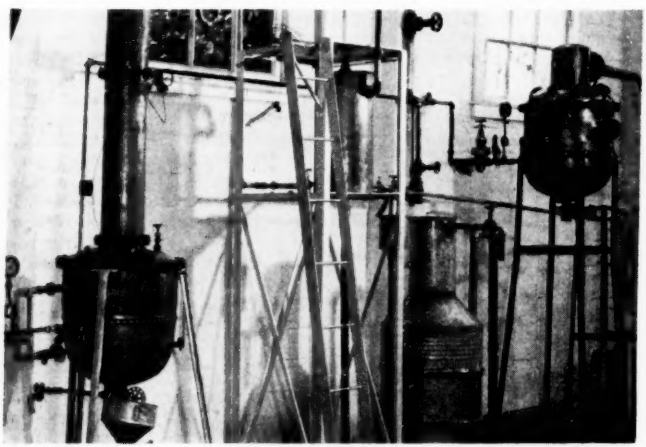
Taste is graded, according to four classifications, from a sampling done by five persons. Candy fondant is used as a base. The classifications are: (1) good and bland, (2) good and sharp, (3) medium, and (4) poor. Odor is classified as sharp, bland, medium or poor.

Information as to taste and odor is recorded on the card, and the data on chemical analysis is filed in the laboratory. The drum is then stored, at 45 deg. F., until needed.

Orders are filled by selecting oils which will best fit the particular requirements of manufacturers. This oil is then moved into the refiner's still-room and pumped into stainless steel blending tanks.

Before being re-used, empty drums are cleaned with steam and, when necessary, with solvent.

The still comprises two columns—the "heads" and the "products." They are of tin-lined copper construction, as are the 0.5 to 4.0-in. pipes used in the still. Both columns have a number of horizontal bubble-cap plates, spaced at intervals of 1-ft.



THESE are pot stills originally used by the company. New fractionating stills (see portion of products column in photo 5) are 50 ft. high.

At the bottom of the still is a 1,500-gal. tin-lined, copper holding tank, into which the oil is pumped from the blending tanks. From the holding tank, another pump delivers the oil into the heads column at a controlled rate.

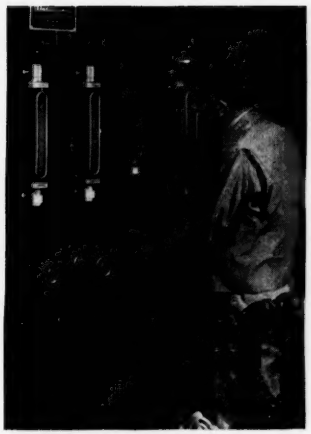
Steam at low pressure is introduced near the bottom and escapes at the top, losing part of its heat on the way. The oil enters the column on one of the middle plates.

Fractionating the Oil

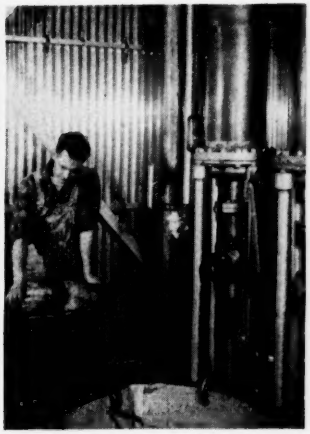
Lighter, lower-boiling fractions found in peppermint oil rise to the top as vapors with the steam, pass into a condenser, and then go to a reflux decanter. Oil rises to the top and drains off through a weir back into the column while the water goes under a baffle plate rising from near the bottom of the decanter and is piped off into a stripper. Here, residual oil is boiled off and goes through a condenser to be sent back to the heads column.

Medium and high boiling fractions are drawn up by a pump into the condenser and then to the decanter, with the water going to the stripper and the recovered oil returning to the heads column. The finished oil is drawn off one of the upper pasteurizing plates, decanted to separate the oil from the water, and piped into stainless steel storage tanks. The bottom oils from the products column are drained off as tars, or waste, aggregating about 2 to 4 percent of the total weight of the peppermint oil.

The fractions are bled off into a series of small holding tanks. Some of these fractions are objectionable and have no value. Others are salvaged for use in compounds.



3 OPERATOR regulates oil flow in still where it is fractionated.



4 SAMPLING reflux decanter. Condensers are seen right foreground.

5 ADJUSTING "products" decanter. Foreground: "Heads" decanter.

From the finished product storage tanks, the oil is pumped into the blending tanks and then through a 15,000 rpm. centrifuge, which removes the remaining excess moisture and solids. From the centrifuge the oil is pumped into drums and it is then ready for shipment.

Rise In Northwest

This new plant emphasizes the growing importance of the peppermint oil industry to the Pacific Northwest. At one time, Michigan and Indiana grew most of the nation's peppermint. But production in that area has declined in recent years, while Oregon and Washington peppermint acreage has been increasing rapidly.

Last year, the crop in the Pacific Northwest exceeded that of Michigan and Indiana for the first time—totaling more than 800,000 lb. (valued at $5,350,000). This was a margin over the eastern area of more than 100,000 lb.

Land under peppermint cultivation in Washington and Oregon aggregates only 16,400 acres, as compared to 22,300 in Michigan and Indiana. But yields in the two Pacific Northwest states run as high as 50 lb. of oil per acre, as against less than 35 lb. in the Midwest. Value of the crop in 1948 was more than $6 a pound.

Principal Growing Areas

The higher yields in the Pacific Northwest are due to freedom from plant diseases, the temperate climate, and an abundant water supply. Peppermint now is worth more to Washington and Oregon than any single fresh vegetable crop, and more than any canned vegetable crop with the exception of peas.

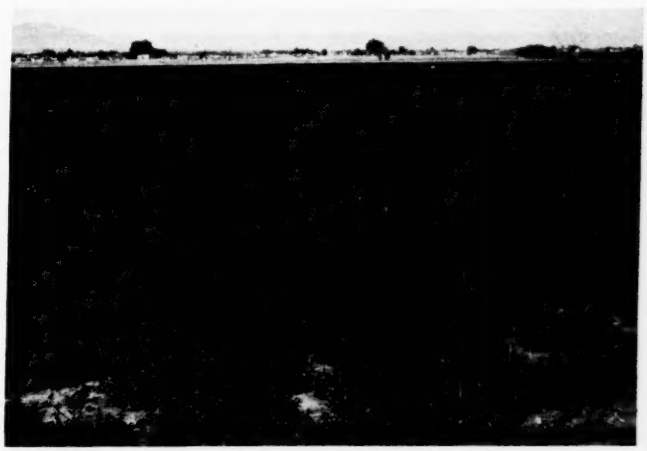
There are four principal areas where peppermint is grown in the Pacific Northwest—the Yakima Valley of Eastern Washington, the Salem and Eugene districts of Western Washington, and on the lower Columbia River in both states. Each area produces a distinctively flavored peppermint oil. The oils from the various districts are blended to suit manufacturers' specifications.

Weeding Is Growers' Headache

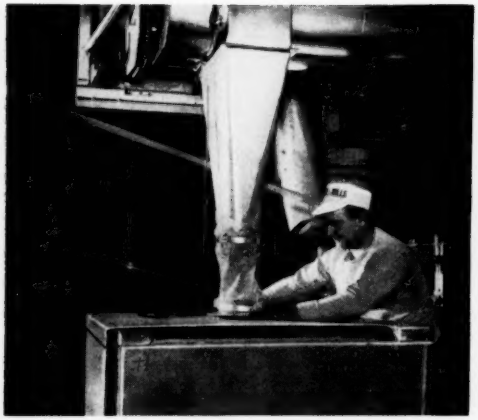
The peppermint (*Mentha piperia*) grows from roots or plants, perennially, to a height of as much as 4 ft. It matures in Eastern Washington in early August and about two weeks later on the West Coast.

Biggest problem in cultivation is weeding—a very important factor because weeds affect the flavor of the oil. Some growers have found that sheep do a good job of eating the weeds while avoiding the peppermint. However, hand weeding is necessary before the crop can be considered ready for harvesting.

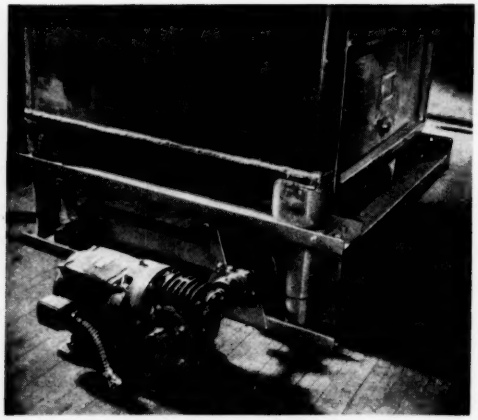
In size, the farms range from 5 to 600 acres. Small farmers have their mint hay custom-distilled, while larger farms have their own stills. At least 25 acres are required for the economic operation of the smallest type still, which has been costing the farmer a minimum of $2,700.



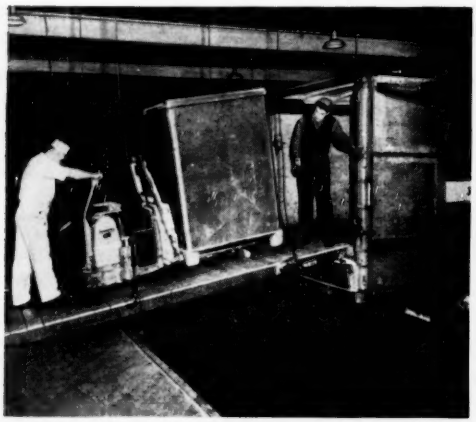
LAND under peppermint cultivation in Washington and Oregon totals 16,440 acres. Yields are about 50-lb. of oil per acre, valued at $6 per lb.



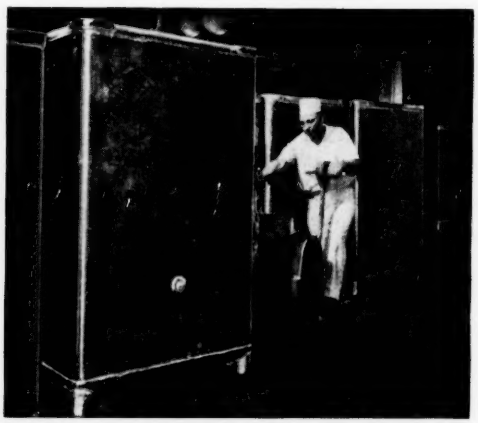
1 **FILLING** at the mill prevents any possible contamination. Flour is spun into bin corners.



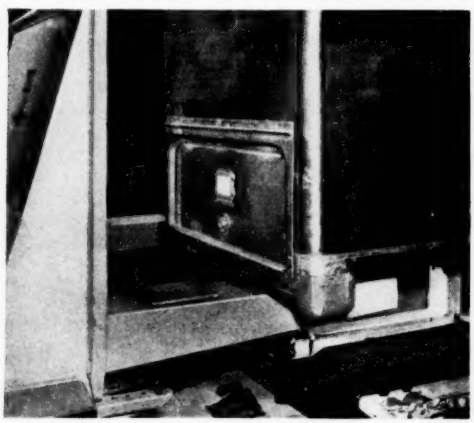
2 **JOLTER** shakes bin 9 to 14 times per minute to settle flour as it flows through spinner.



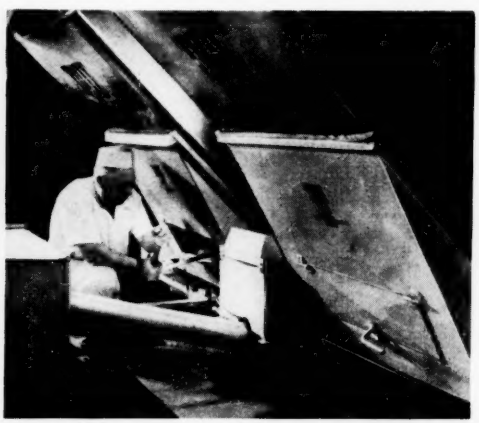
4 **LOADING** and unloading on truck or freight car is a relatively simple and fast operation



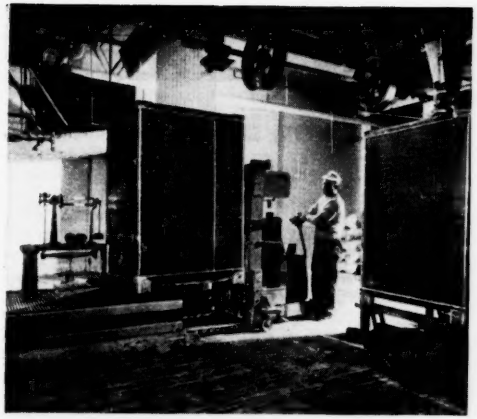
5 **STORAGE** at processing plant is clean, also economizes on space. Easy movement is feature.



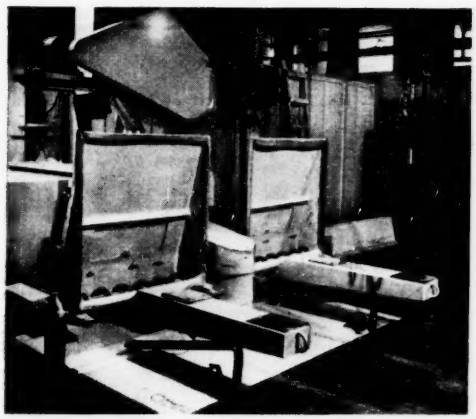
7 **EMPTYING DOOR** is at bottom of the bin. Flour pours through it when bin is tilted.



8 **SPILLING** into conveyor to be carried to mixers, flour can be seen here through back of tilt.



3 **HAND TRUCKS** easily move filled bin. First stop is made at the weighing station.



6 **TILTERS,** seen here without bins, are employed to dump the flour into closed screw conveyors.

Portable Bins Show Value In Handling Bulk Goods

Experiments with flour transportation at mill and bakery hold promise for other users of powdered food ingredients

LARGE-BIN handling of dry powdered materials is regarded as a possibility, in many segments of the food industry, as the result of an experiment now being closely watched by bakers and millers. Dubbed Tote Bins by their manufacturer, the Tote Engineering Co., Seattle, these aluminum containers are being used to transport flour from General Mills flour milling plant to the Zinsmaster Baking Co., both in Minneapolis.

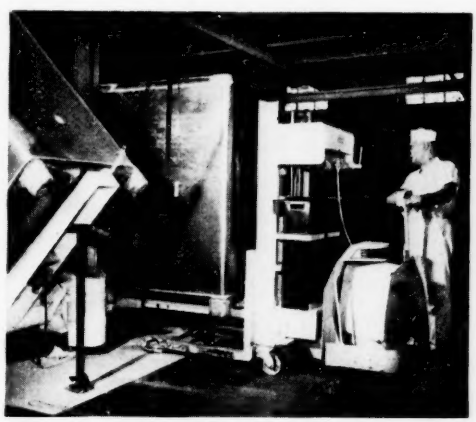
The picture story on these pages illustrates the basic advantages, chief of which are: The practical elimination of exposure to contamination, greater efficiency in handling and storage, and little or no loss in transit.

There are disadvantages, too: Cost of returning empty bins to source of supply, cost of storing empty bins, and concentrated bulk and weight, which some plants are not equipped to accommodate.

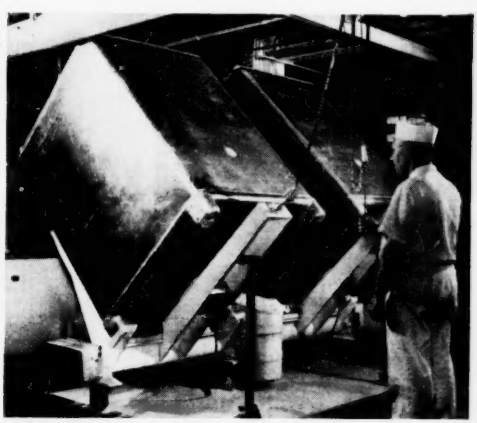
Suited to Truck or Rail Transport

While transportation on this Minneapolis test has been confined to truck haulage, rail shipments are considered feasible. A 50 ft. freight car will accommodate 28 bins, each bin having a capacity of from 3,000 to 3,500 lb. of flour. Obviously, the capacity would vary with the weight of the material being carried.

The bins measure 68 in. high, 48 in. deep and 42 in. wide, and they weigh 218 lb. each. They are leased by Tote Engineering at a rental of $6 per month. Special equipment for filling and emptying is required, as shown in the operation pictured here.



9 **ONE MAN** takes care of dumping bins, moving one into position while other empties.



10 **POWER** for tilting bins comes from overhead crane. Motor under arm of rack provides vibration.

VITAL extract computation is made after wort is prepared in brew kettles (above) by boiling mash extract and hops.

Table Gives Quick Check On Brewing Efficiency

Unnecessary calculations are eliminated by giving amount of extract per barrel of wort at 5 deg. C. instead of 20 deg.

R. B. OESTING

Vice-President, Paul Lewis Laboratories, Inc., Milwaukee, Wis.

In brewing, the general practice is to measure the volume of wort in a cellar, then calculate the pounds of extract per barrel of wort.

These steps are taken to determine the efficiency of the

Brewmaster Can Speedily Apply These

PER-BARREL EXTRACT of Wort at 4 deg. R. Calculated

Percent Plato	Lb. Ext. Per Bbl. at 4°R	Baumé (Modulus 145)	Sp. Gr. at 20°C./20°C. in Air	Percent Plato	Lb. Ext. Per Bbl. at 4°R	Baumé (Modulus 145)	Sp. Gr. at 20°C./20°C. in Air
0.0	..	.00	1.00000	6.0	15.91	3.35	1.02369
0.1	.26	.06	39	6.1	16.18	3.41	2409
0.2	.52	.11	78	6.2	16.45	3.46	2450
0.3	.78	.17	117	6.3	16.73	3.52	2490
0.4	1.04	.22	156	6.4	17.00	3.57	2530
0.5	1.30	.28	194	6.5	17.27	3.63	2571
0.6	1.56	.34	233	6.6	17.54	3.69	2611
0.7	1.82	.39	272	6.7	17.81	3.74	2652
0.8	2.08	.45	312	6.8	18.09	3.80	2692
0.9	2.34	.51	351	6.9	18.36	3.85	2733
1.0	2.60	.56	1.00390	7.0	18.63	3.91	1.02773
1.1	2.86	.62	429	7.1	18.90	3.96	2814
1.2	3.12	.67	468	7.2	19.18	4.02	2854
1.3	3.39	.73	507	7.3	19.45	4.08	2895
1.4	3.65	.79	546	7.4	19.73	4.13	2936
1.5	3.91	.84	585	7.5	20.00	4.19	2976
1.6	4.17	.90	624	7.6	20.27	4.24	3017
1.7	4.43	.95	663	7.7	20.55	4.30	3058
1.8	4.70	1.01	702	7.8	20.82	4.35	3098
1.9	4.96	1.07	741	7.9	21.10	4.41	3139
2.0	5.22	1.12	1.00780	8.0	21.37	4.46	1.03180
2.1	5.48	1.18	819	8.1	21.65	4.52	3221
2.2	5.75	1.23	859	8.2	21.92	4.58	3262
2.3	6.01	1.29	898	8.3	22.20	4.63	3303
2.4	6.28	1.34	937	8.4	22.48	4.69	3344
2.5	6.54	1.40	977	8.5	22.76	4.74	3385
2.6	6.80	1.46	1016	8.6	23.03	4.80	3426
2.7	7.07	1.51	1055	8.7	23.31	4.85	3467
2.8	7.33	1.57	1094	8.8	23.59	4.91	3508
2.9	7.60	1.62	1134	8.9	23.86	4.96	3549
3.0	7.86	1.68	1.01173	9.0	24.14	5.02	1.03590
3.1	8.13	1.74	1213	9.1	24.42	5.07	3631
3.2	8.39	1.79	1252	9.2	24.70	5.13	3672
3.3	8.66	1.85	1292	9.3	24.98	5.19	3713
3.4	8.92	1.90	1331	9.4	25.26	5.24	3755
3.5	9.19	1.96	1371	9.5	25.54	5.30	3796
3.6	9.46	2.02	1410	9.6	25.81	5.35	3837
3.7	9.72	2.07	1450	9.7	26.09	5.41	3879
3.8	9.99	2.13	1490	9.8	26.37	5.46	3920
3.9	10.25	2.18	1529	9.9	26.65	5.52	3961
4.0	10.52	2.24	1.01569	10.0	26.93	5.57	1.04003
4.1	10.79	2.29	1609	10.1	27.21	5.63	4044
4.2	11.05	2.35	1649	10.2	27.49	5.68	4086
4.3	11.32	2.40	1688	10.3	27.78	5.74	4127
4.4	11.59	2.46	1728	10.4	28.06	5.80	4169
4.5	11.86	2.52	1768	10.5	28.34	5.85	4210
4.6	12.12	2.57	1808	10.6	28.62	5.91	4252
4.7	12.39	2.63	1848	10.7	28.90	5.96	4293
4.8	12.66	2.68	1888	10.8	29.19	6.02	4335
4.9	12.92	2.74	1928	10.9	29.47	6.07	4377
5.0	13.19	2.79	1.01968	11.0	29.75	6.13	1.04418
5.1	13.46	2.85	2008	11.1	30.03	6.18	4460
5.2	13.73	2.91	2048	11.2	30.31	6.24	4502
5.3	14.01	2.96	2088	11.3	30.60	6.30	4544
5.4	14.28	3.02	2128	11.4	30.88	6.35	4585
5.5	14.55	3.07	2168	11.5	31.16	6.41	4627
5.6	14.82	3.13	2208	11.6	31.44	6.46	4669
5.7	15.09	3.18	2248	11.7	31.72	6.52	4711
5.8	15.37	3.24	2289	11.8	32.01	6.57	4753
5.9	15.64	3.30	2329	11.9	32.29	6.63	4795

brewhouse operation—for the greater the extraction, the less the cost of the beer.

Obviously, "long-hand" figuring of these primary values entails much laborious arithmetic, hence tables have come into use to provide a time-saving short-cut. Latest revision was that by Malvin J. Mayer in 1946, expressing results at 20 deg. C.

Further elimination of unnecessary calculations is the purpose of the handy table presented here. In this new form, the working data are most valuable to the brewmaster and his laboratory—because yield of extract is given at the commonly employed cellar temperature of 4 deg. R. (5 deg. C.). Values expressed in the table are based on the U. S. Bureau of Standards' Circular C440.

Column 1 contains the hydrometer readings in Plato values as usually determined at 20 deg. C in the brewery. Column 2 contains the corresponding values for pounds of extract per barrel of wort to be expected in the cellar at 4 deg. R. (5 deg. C.). Column 3 contains the Baumé values* that correspond to Plato values, for use in the event the brewer employs a Baumé hydrometer. And Column 4 contains the specific gravity of the wort as determined in the laboratory with a pycnometer at 20 deg. C./20 deg. C.

How Values are Computed

A typical example of the method of calculation of the values given follows:

At 5 percent by weight concentration, Table 114** gives 5.089 percent by volume for extract. Using Table 119** to convert this value to 4 deg. R. (5 deg. C.), we obtain—

$$5.089 \times \frac{1.000}{.9978} = 5.1002 \text{ percent extract by volume.}$$

Then it follows that 5.1002 g. of extract is contained in 100 ml. of wort:

1 gal. = 3.78533 liters

1 lb. = 453.50g.

31 x 3.78533 x 10/453.59 = factor to convert percent by volume to lb. of extract per bbl. of wort

2.5869 = factor

Then:

5.1002 x 2.58969 = 13.19 lb. of extract per barrel of wort.

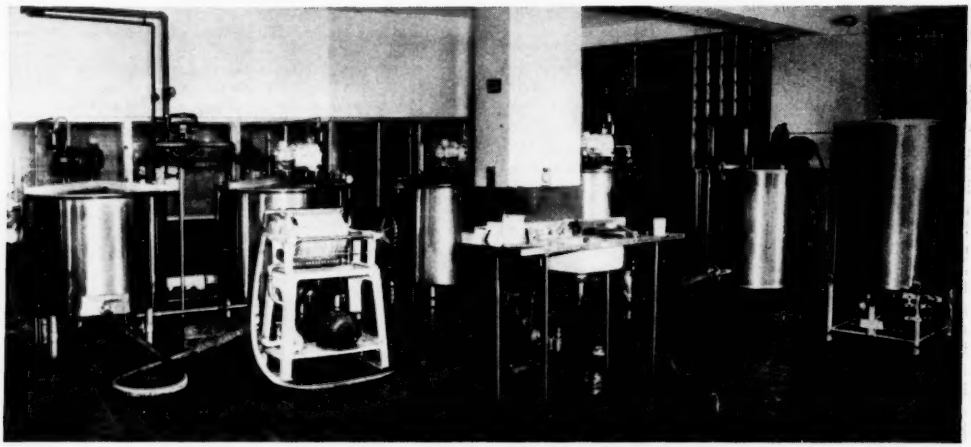
*These data are given because Baumé hydrometers are today more readily available and easier replaced.

**Table number used in U. S. Bureau of Standards Circular C440.

Data to Determine Extract Value of Wort

From National Bureau of Standards Circular C440

Percent Plato	Lb. Ext. Per Bbl. at 4°R	Baumé (Modulus 145)	Sp. Gr. at 20°C./20°C. in Air
12.0	32.57	6.68	1.04837
12.1	32.86	6.74	4879
12.2	33.14	6.79	4921
12.3	33.43	6.85	4963
12.4	33.72	6.90	5005
12.5	34.01	6.96	5047
12.6	34.29	7.02	5090
12.7	34.58	7.07	5132
12.8	34.87	7.13	5174
12.9	35.15	7.18	5216
13.0	35.44	7.24	1.05259
13.1	35.73	7.29	5301
13.2	36.01	7.35	5343
13.3	36.30	7.40	5386
13.4	36.59	7.46	5428
13.5	36.88	7.51	5470
13.6	37.16	7.57	5513
13.7	37.45	7.62	5556
13.8	37.74	7.68	5598
13.9	38.02	7.73	5641
14.0	38.31	7.79	1.05683
14.1	38.60	7.84	5726
14.2	38.89	7.90	5769
14.3	39.18	7.96	5811
14.4	39.47	8.01	5854
14.5	39.76	8.07	5897
14.6	40.05	8.12	5940
14.7	40.34	8.18	5982
14.8	40.63	8.23	6023
14.9	40.92	8.29	6068
15.0	41.21	8.34	1.06111
15.1	41.51	8.40	6154
15.2	41.80	8.45	6197
15.3	42.10	8.51	6240
15.4	42.39	8.56	6283
15.5	42.69	8.62	6326
15.6	42.98	8.67	6369
15.7	43.28	8.73	6412
15.8	43.57	8.78	6455
15.9	43.87	8.84	6499
16.0	44.16	8.89	1.06542
16.1	44.46	8.95	6585
16.2	44.75	9.0	6629
16.3	45.05	9.06	6672
16.4	45.34	9.11	6715
16.5	45.64	9.17	6759
16.6	45.93	9.22	6802
16.7	46.23	9.23	6845
16.8	46.52	9.33	6889
16.9	46.82	9.39	6933
17.0	47.11	9.45	1.06976
17.1	47.41	9.50	7020
17.2	47.70	9.56	7063
17.3	48.00	9.61	7107
17.4	48.30	9.67	7151
17.5	48.60	9.72	7194
17.6	48.89	9.78	7238
17.7	49.19	9.83	7282
17.8	49.49	9.89	7325
17.9	49.78	9.94	7369
18.0	50.08	10.00	1.07413
18.1	50.38	10.05	7457
18.2	50.68	10.11	7501
18.3	50.98	10.16	7545
18.4	51.28	10.22	7589
18.5	51.58	10.27	7633
18.6	51.87	10.33	7677
18.7	52.17	10.38	7721
18.8	52.47	10.44	7765
18.9	52.77	10.49	7809
19.0	53.07	10.55	1.07853
19.1	53.37	10.60	7898
19.2	53.68	10.66	7942
19.3	53.98	10.71	7986
19.4	54.29	10.77	8030
19.5	54.59	10.82	8075
19.6	54.89	10.88	8119
19.7	55.20	10.93	8164
19.8	55.50	10.99	8208
19.9	55.81	11.04	8252
20.0	56.11	11.10	1.08297
20.1	56.42	11.15	8342
20.2	56.72	11.21	8386
20.3	57.03	11.26	8431
20.4	57.33	11.32	8475
20.5	57.64	11.37	8520
20.6	57.94	11.43	8565
20.7	58.25	11.48	8609
20.8	58.55	11.54	8654
20.9	58.86	11.59	8699
21.0	59.16	11.65	1.08744
21.1	59.47	11.70	8789
21.2	59.78	11.76	8834
21.3	60.08	11.81	8879
21.4	60.39	11.87	8923
21.5	60.70	11.92	8968
21.6	61.01	11.98	9013
21.7	61.32	12.03	9058
21.8	61.62	12.09	9103
21.9	61.93	12.14	9149
22.0	62.24	12.20	1.09194
22.1	62.55	12.25	9239
22.2	62.86	12.31	9284
22.3	63.17	12.36	9329
22.4	63.48	12.42	9375
22.5	63.80	12.47	9420
22.6	64.11	12.52	9465
22.7	64.42	12.58	9511
22.8	64.73	12.63	9556
22.9	65.04	12.69	9602
23.0	65.35	12.74	1.09647
23.1	65.66	12.80	9693
23.2	65.98	12.85	9738
23.3	66.29	12.91	9784
23.4	66.60	12.96	9829
23.5	66.92	13.02	9875
23.6	67.23	13.07	9921
23.7	67.54	13.13	9966
23.8	67.85	13.18	10012
23.9	68.17	13.24	10058
24.0	68.48	13.29	1.10104



SANITATION, cleanliness, and operating convenience characterize this sirup room in the bottling plant of Kirsch's Beverages, Inc., Brooklyn, N. Y. Note tile floors, glass walls and stainless steel equipment.

SIRUP MAKING: It Is Primary Operation in Beverage Plant . . . Increasing Use of Dextrose Noted

Different methods and ingredients are described—with sweeteners in combination recommended. Employment of high-purity, low-mineral water is a "must"

J. H. BUCHANAN

Buchanan Consulting Laboratories, Inc.
Chicago, Ill.

Three main functions are performed by sirups in soft drinks: (1) they provide sweetness which, when properly balanced with acid and other taste factors, produces a balanced flavored drink; (2) They furnish body that lifts a beverage out of the watery class, and (3) They carry the flavor and deposit it evenly—in just the right manner—in the drink.

Two sirups are usually prepared—simple sirup, a mixture of one or more sweetening agents with water in such proportions as to give a product of uniform strength (usually 26 to 34 deg. Be.); and finished, or flavored sirup, consisting of simple sirup to which has been added flavors and other agents responsible for the taste.

Since water is an important ingredient of sirup, it should be free from agents responsible for spoilage, and from off-tastes, odors, color, and suspended matter. The alkalinity should not exceed 50 to 60 ppm.

The other main ingredient is the sweetening agent, of which there are a number of kinds. The ones most commonly used are: Sucrose (crystal or liquid cane or beet sugar); dextrose (crystal or liquid corn sugar); honey; and cereal sirups. At the present time, sucrose, either as cane or beet sugar or as liquid sugar, is the sweetener in principal use. Dextrose stands second and is on the increase.

SUCROSE. Too much attention cannot be given to the purity of the cane or beet sugar used in carbonated beverages. By purity is meant freedom from foreign matters—particularly microorganisms that might cause spoilage in the finished product. Bottlers are urged to consider this matter seriously and purchase sugar of the highest quality. The package in which sugar is received has a bearing on quality, as has also the method of storage.

Paper Bags Replace Barrels

Prior to the advent of the paper bag, barrels were quite common, and were very satisfactory containers. However, paper bags, containing 100 lb. of sugar, are much more convenient to handle. They are easy to clean and will not hold dust and dirt, as do burlap or cotton bags.

Sugar should be stored in a dry room upon platforms which will permit free circulation of air. This will help keep the sugar dry.

LIQUID SUGAR is coming into use in the soft drink industry and should prove beneficial as well as economical. Although different refiners produce liquid sugar according to their own processes, the following may be considered typical of their contents:

1. All sucrose, water white with a sucrose content of approximately 68 percent.

2. All sucrose, with higher ash and slight color. Sucrose content about 68 percent.

3. Partially inverted sirup containing equal amounts of sucrose and invert sugars. Due to greater solubility of the invert sugars, the sweetening power of this product is greater—equivalent to a sirup containing about 78 percent sucrose. For the manufacture of soft drinks, this type of liquid sugar is probably more satisfactory than either of the above.

Liquid sugar has a number of advantages over crystal sugars, in the production of sirup for beverage manufacture. Some of these are:

1. Ease of handling. It is simpler to turn a few valves, measuring the required quantity of sirup, than it is to store, transport and dump 100-lb. bags of sugar.

2. Economy. In normal times liquid

sugar is sold at a price differential compared with crystal sugar. It is sold on the basis of sugar content, however, and the water present becomes a factor whenever long shipments are involved.

3. Purity. Most refiners employ the same care in purification of liquid sugar as they do in the production of crystal sugars. The chief difference is that the process is stopped before crystals of sucrose are formed. No cases of spoilage in beverages, traceable to liquid sugar, have been observed in the last few years.

DEXTROSE, commonly known as corn sugar, is becoming increasingly important in sirup preparation—not as the sole sweetening agent, but blended with sucrose to improve the body of the finished beverage.

It is a crystalline sugar which is produced commercially in three forms. Two general types are known—alpha and beta dextrose. Alpha dextrose exists in either the hydrate or anhydrous modification. Corresponding formulas would be $C_6H_{12}O_6$ and $C_6H_{12}O_6 \cdot H_2O$. The commercial type of beta dextrose is the anhydrous. All three forms have been used in sirup preparation.

The alpha forms are characterized by lower solubility, and a decreased rate of solubility, when compared with sucrose. They are particularly difficult to dissolve in cold water. Use of either of these forms entails the employment of hot water, or at least water well above the temperature of the average cold water.

Beta anhydrous dextrose is readily soluble in cold water. This property gives it an advantage over the two other forms in sirup making.

Less Sweet Than Sucrose

The sweetness of dextrose is given as 74.5 when compared with sucrose as 100. To some soft drink manufacturers this lack of sweetness is regarded unfavorably; others, however, regard it as an asset. If sweetness alone were the sole purpose of sugar in a sirup, then sucrose would satisfy all requirements. But in many cases it is desirable to insure body without producing excessive sweetness. Under these conditions the use of dextrose to replace a part of the sucrose is recommended.

As an example, a finished grape beverage has been manufactured with 16 percent sucrose. Such a beverage is entirely too sweet. Adding more acid simply burns it up. But use of dextrose to the extent of 50 to 60 percent of the total sugar gives a beverage with a good body and the right amount of sweetness.

Many who have studied sirup preparation agree that sirups made from a blend of sucrose and dextrose produce better beverages than those made from sucrose alone.

OTHER SWEETENING AGENTS, such as corn sirups (both high and low conversion types) honey, and cereal grain sirups, were used to a considerable extent during the period of sugar rationing. High-conversion corn sirup is still used to a certain extent. Since the sweetness of this product is about 60, it is necessary to blend it with sucrose to produce a satisfactory simple sirup.

Acids Also Used

Acids are added to either the simple or finished sirups. They aid in maintaining the sweetness-sourness balance of the finished beverage, and prevent growth of microorganisms. The acids most commonly used are citric, tartaric and phosphoric. Lactic, malic, and perhaps some others have been, and are still, used to a limited extent.

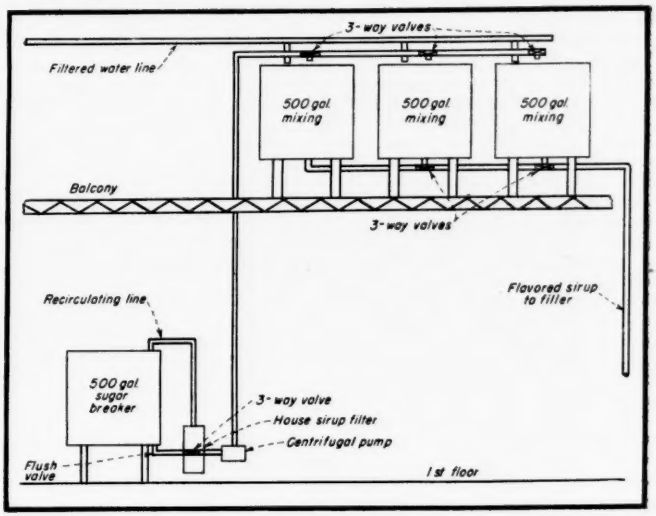
Most soft drinks contain one or more acids. Cream soda and some root beers, however, are made without acid.

The "How" of Simple Sirups

Two general processes are used for the preparation of simple sirup—cold and hot. These may be further subdivided into those using acid and those without acid. Advantages of the cold process are that only simple equipment is required, and the sirup does not need to be cooled before its use in beverages.

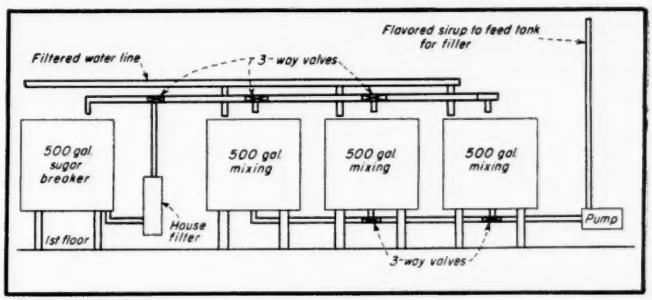
When crystal sugar or sugars are to be used in the preparation of simple sirup, a sugar breaker is generally employed. This is a stainless steel tank

Varying Layouts for the Vital Sirup Room



It may be located on balcony . . .

FIG. 1. When sirup room is on the balcony, it is frequently more convenient to locate the sugar breaker on ground floor and pump the simple sirup.



. . . or on main bottling floor

FIG. 2. With one-story arrangement, the flavored sirups are pumped from sirup room directly to siruper, or to feed tank located above filler.

equipped with one or two agitators, depending upon the size of the tank. The usual practice is to draw the desired quantity of water into the tank, start the agitator, and add the sugar. Agitation should be just fast enough to insure mixing of the sugar and water. Too vigorous agitation will incorporate into the sirup some air, which may be detrimental to the finished beverage. The warmer the water the more rapid will be the dissolving of the sugar.

The sugar breaker is usually located on the ground floor of the bottling plant, because it is easier to pump the sirup than to transport bags of sugar to the sirup room. When liquid sugar is used, the storage tank may be located on the same floor with, or in, the sirup room. The ground floor is often suitable.

When liquid sugar is used as the sweetening agent, preparation of simple sirup is easy. The proper amount of liquid sugar is measured into a tank containing a measured amount of water. These are mixed with slow agitation.

Sugar content of the simple sirup should be carefully determined. This is usually done with a hydrometer. Readings may be in either Brix (a direct percentage) or Baume.

If the sirup is to stand for any length of time, it is advisable to add acid. A desirable practice is to add all of the acid which will be required in the finished beverage. This will assure sterility of the sirup. So-called light sirups—26 to 30 Be.—should never be stored without added acid.

The value of acid as a preservative for a simple sirup is indicated in Table I. This table shows the length of time required to produce satisfactory sterility with different amounts of acid.

When a bottler uses flavoring concentrates containing all of the acid needed in the finished beverage, simple sirup production should be so planned that there is no carry-over.

Hot-Process of Sirup Manufacture

In the hot process, the sirup is heated to the boiling point in a steam jacketed stainless steel tank. If no acid is to be added, the sirup is held at this temperature for five minutes to insure sterility.

The sirup must be cooled before it is used in a beverage, and this may be accomplished by circulating cold water through the jacket of the tank. This is a slow process, however, and ties up the tank for a considerable period. In the long run, it is more economical to install a separate cooler. In this way the sirup can be filtered while hot, then passed through the cooler.

When acid is added during the heating process, inversion of the sucrose will take place, with production of dextrose and levulose. Since these are compounds distinct from sucrose, they give the sirup a different flavor. Once the majority of the sucrose has been inverted, there will be no further change in taste. This is very important because, in a beverage made from cold-process simple sirup, and containing acid, inversion of sucrose continues after bottling. The result is a gradual change in the flavor of the product. Change in sucrose and reducing-sugars content in a bottle of beverage, over a period of 112 days, is shown in Table II.

With the hot process of sirup manufacture, using acid, no further inversion will occur after bottling. Table III gives data on the inversion of sucrose in sirups of different gravities at 180 deg. F.

For practical purposes, an inversion of 50 percent of the sucrose is sufficient. Consequently, the addition of as little as 1 oz. of 40 percent acid per gal. would bring about satisfactory inversion in hot-process sirup.

These facts indicate the further value of liquid sugar and dextrose. Liquid sugar containing 50 percent invert sugar is available. Its use precludes the necessity for further inversion. Since dextrose is one of the constituent parts of invert sugar, no inversion due to its presence would take place. Therefore, a sirup prepared with 50 percent sucrose and 50 percent dextrose would be satisfactory from the standpoint of further inversion in the finished product.

After the simple sirup has been prepared, it should be filtered. For this purpose, many types of filters are used. Of great importance here is the factor of ease of dismantling for thorough cleaning and sterilizing.

TABLE I—ACID Preserves Simple Sirups

	Days Required to Produce Sterility With Given Amounts of 50 Percent Citric Acid per Gal. of Sirup		
Be. of Sirup	1 oz.	2 oz.	4 oz.
24	5	4-5	3-4
30	2-3	2	1-1½
36	1-1¼	1	1

TABLE II—AFTER BEVERAGES are Bottled, Sucrose Inversion Continues

Time in Days	Sucrose Percent	Reducing Sugar Percent
0	8.37	0.53
1	8.35	0.55
4	8.10	0.80
8	7.70	1.20
17	7.10	1.80
32	6.10	2.80
46	5.33	3.57
59	4.48	4.42
112	2.80	6.10

TABLE III—SUCROSE INVERSION Goes Fast at 180 Deg. F.

Gravity of Sirup Be.	50% Citric Acid, Oz. per Gal.	Inversion 30 Min. at 180 Deg. F., Percent
24	1	94.44
24	2	97.44
30	1	97.10
30	2	97.80
30	4	98.70
33	2	97.40
33	4	98.40

Blending In the Flavors

The finished, or flavored sirup, contains, in addition to simple sirup, the flavoring ingredients. When acid is added at this stage, it should be incorporated in the simple sirup with slow agitation before the flavoring is added.

Slow agitation is even more important after the addition of the flavoring. For rapid agitation at this point will incorporate air into the sirup—possibly resulting in oxidation of the more delicate flavoring constituents and a consequent off-flavor in the finished beverage. This is particularly true of citrus flavors—cases having been noted in which orange flavored beverages have taken on decided off-flavors as soon as bottled, probably due to the too rapid agitation during blending of sirup and flavoring materials.

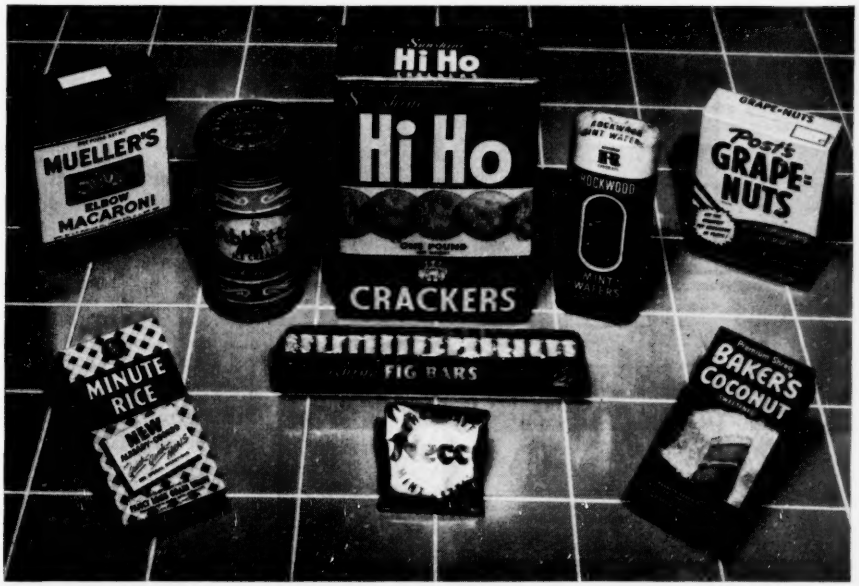
Sirup Room Requirements

Frequently, the sirup rooms are located on the second floor or balcony (see Fig. 1). This has the advantage of gravity flow of the finished sirup to the siruper in the bottling room below. Where this is not feasible, the room may be located on the same level as the bottling room, with the flavored sirup pumped to the siruper, or to supply tank (see Fig. 2).

Regardless of the location, the sirup room should have: (1) Plenty of light; (2) tile floors sloped for good drainage; (3) tile walls to at least 6 ft. from the floor; (4) smooth painted ceiling and walls above the tiling; (5) well screened windows and doors; and, if possible, (6) air conditioning.

Such a room is easily maintained in a clean, sanitary condition. The great advantage of air conditioning is the elimination of air-borne microorganisms.

Equipment should be of sanitary construction, preferably of stainless steel. This same material should be used in the lines leading into and out of the sirup room. Pyrex glass piping has been successfully used for lines between sirup tanks, and plastic tubing and hose for lines to filters. Stainless steel piping, with so-called sanitary fittings, is looked upon favorably by health officials because of the ease with which it can be dismantled for cleaning and sterilizing.



These nine exemplary food packages illustrate sound . . .

PACKAGE DEVELOPMENT

How leading food companies have developed packages which protect product quality, insure necessary shelf-life, handle efficiently in production and distribution, have high merchandising and consumer values and keep costs at a minimum.

ALICE M. WILSON
Staff Editor, "Food Industries"

A good food package very seldom just happens. It results from the cooperative efforts of many workers within plant departments, often with outside help from such packaging experts as designers, consultants, and materials and equipment suppliers.

Since the designing and engineering of a good package is a major processing project which can quickly win or lose company dollars and goodwill, it is essential that package planning and development be directed with utmost care. What's more, it is sometimes easier to solve your own problems after seeing how others solved theirs.

So FOOD INDUSTRIES, with the helpful cooperation of several food plants, studied the steps taken in the actual development of successful food packages now on the market and case histories of nine representative packages are detailed in this article. They will be of pertinent aid to you in your own packaging developments.

SPECIAL CHECK-LIST

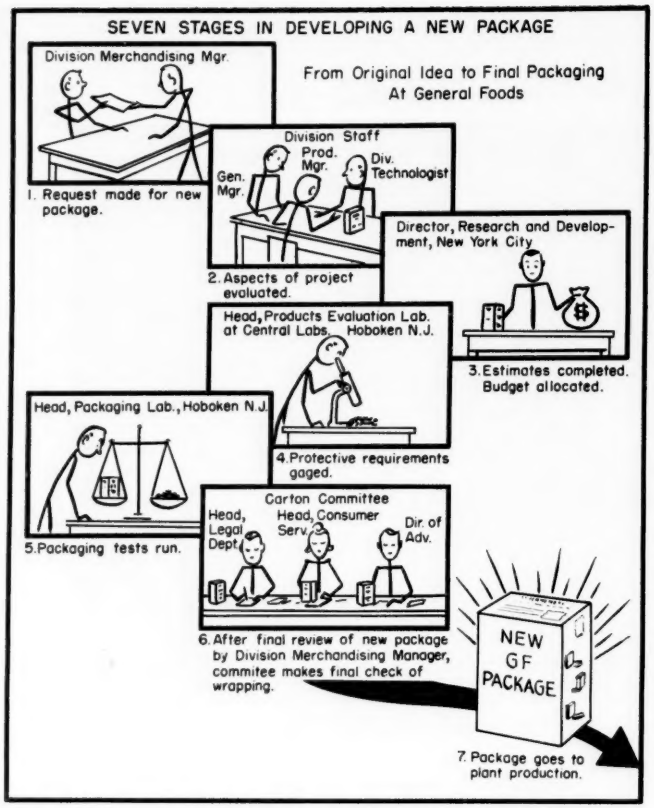
HOW *THEY* DID IT is told in this article revealing actual experiences of leading food companies in developing nine outstanding packages.

AND HOW *YOU* CAN DO IT is explained in our comprehensive Package Check-List (insert, inside front cover) comprising a thorough guide to all phases essential in preparing your own successful food package—The Editors.

The case studies include several different types of packaged foods manufactured by processors whose organizations vary both in size and structural pattern. In the development of each package, there is specific delegation of responsibility to competent personnel both within and without company organization to fulfill each respective phase of the package—even though individual requirements may differ.

In each case, it will be noted that all persons concerned meet and exchange their individual packaging ideas and suggestions until the final "compromise" package subject to everyone's approval evolves ready for the consumer's purchase.

In addition, these salient data, together with suggestions from other packaging experts, have been collated


SEVEN STAGES IN DEVELOPING A NEW PACKAGE
From Original Idea to Final Packaging At General Foods
Division Merchandising Mgr.
1. Request made for new package.
Division Staff
Prod. Mgr.
Div. Technologist
Gen. Mgr.
2. Aspects of project evaluated.
Director, Research and Development, New York City
3. Estimates completed. Budget allocated.
Head, Products Evaluation Lab. at Central Labs. Hoboken N.J.
4. Protective requirements gaged.
Head, Packaging Lab., Hoboken N.J.
5. Packaging tests run.
Carton Committee
Head, Legal Dept.
Head, Consumer Serv.
Dir. of Adv.
6. After final review of new package by Division Merchandising Manager, commitee makes final check of wrapping.
NEW GF PACKAGE
7. Package goes to plant production.

STEPS leading to a successful package are shown here pictorially.

into a convenient Package Check-List for use in your own packaging developments. This handy chart is inserted inside the front cover of this issue of FOOD INDUSTRIES.

Indicates Person Responsible

The delegation of responsibility indicated in the case studies is clearly tabulated in the Package Check-List. To the right of each question and item treating each particular phase in development, we have marked off those personnel specifically responsible for doing the job involved and making needed decisions. Personnel are described by the following terms: Management, Production, Research and Development, Sales, Advertising, Purchasing and Legal. To further explain positions included under these broad departmental headings, we have listed actual job titles in the space directly above the columns of the chart. These titles will vary, of course, from plant to plant but they have been made so flexible that it should be very easy to transpose them into your company's organizational set-up.

This Check-List has been purposefully made as all-inclusive as possible to fit everyone's need. We realize that it would be a rare case if any one package called for consideration of all the packaging stages described. So that this guide chart can be used by food plant personnel as a direct working tool, we have included, in the far left column, space for you to pencil-check those exact phases of development pertaining to your own packaging project.

Information in this chart may further serve as a specific departmental guide if individual divisions will segregate from it those particular responsibilities related to their own packaging interests. In this way, the grouped data will be accurately coordinated and can be used as a handy functional reference by all departmental personnel.

Three Objectives

Now returning to the case studies, the procedure at **General Foods for** developing a package for a new product or improving the package for an old product is much the same. Sales, Production and Research initiate changes.

Problems of developing a new or revised package are channeled by management through the Central Research Department, under which the Packaging Laboratory functions. To the extent advisable, the laboratory at the plant concerned also cooperates.

Combined efforts of these groups test all indicated types of package materials in all possible packaging combinations, within packaging-cost limits which have been established. Objectives are always:

1. A package which adequately protects the quality of the product during the necessary shelf-life.
2. A package which meets production requirements.
3. A package with the greatest merchandising values consistent with (1) and (2) and within cost limitations.

Departments Work Together

Frequently, a number of packages fulfilling the requirements are developed, but at different cost levels. These are submitted to both sales and management departments for elimination. During the course of development, the Packaging Laboratory, with a staff of eight, and the Engineering or Production departments at the plant of manufacture cooperate to test the adaptability of prospective packages to existing production lines. They also check regarding packaging machine adjustments necessary to fit the needs of the proposed package.

The Merchandising Department, which is responsible for whatever appears on the package, handles the layout and printing, alloting space on the package to the Consumer Service Department for recipes and adequate instructions.

When a package is tentatively agreed upon, it is tested in the field to determine how well it stands up under severe shipping conditions. The package is subjected to various storage conditions to determine shelf-life in warehouse, store and home. Returned packages are then taste-tested by the Consumer Council.

When the package is apparently satisfactory, it passes through Management to the Packaging Committee. Represented on this committee are the Legal Department, the Consumer Service Department, Headquarters Sales Department, and general management of the plant of production.

The package is cleared by the Packaging Committee subject only to the final approval of general headquarters. All package developments are channeled through the organization as shown in the pictorial chart (above).

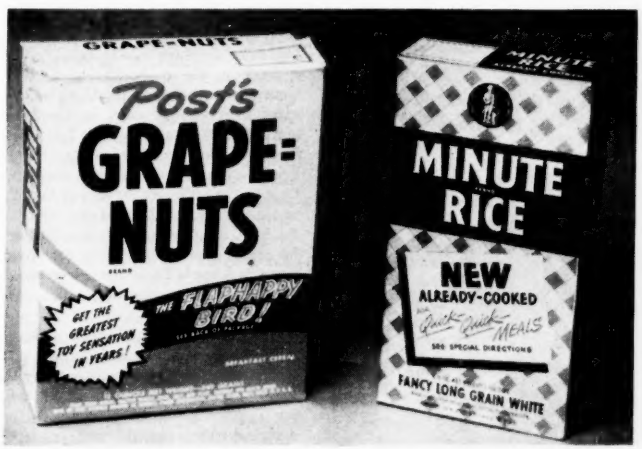
GLASSINE AND HEAVY WAX PAPER protect both package and contents.

1. Oil-Resistant Liners Guard Coconut Carton

The Baker's Shredded Coconut package was recently changed because Sales complained that the package became oily in appearance during shelf-life. The oil, reaching the surface of the container, readily collected dust, which made the package unattractive. The problem of correcting this difficulty was routed by management of GF's Franklin Baker Div. through Central Research to the Package Laboratory.

Many materials were tested, singly and in combination, by the Packaging Laboratory, until a satisfactory package was produced. The new package contains two liners wrapped around the shredded coconut inserted in a folding carton. The liner next to the coconut is glassine; the outer liner, heavy wax paper.

Final adoption of this package was in accordance with regular GF procedure as described.



PACKAGE DESIGNS win brand recognition for two General Foods products.

2. & 3. "Family" Identified In Cereal, Rice Boxes

A change in the Grape-Nuts package was requested by Sales and Management departments of the Post Division of General Foods. The problem was to increase the merchandising values of the package by giving it a family resemblance to other Post cereal packages—Post Toasties, Post's Raisin Bran, 40% Bran Flakes, Grape-Nuts Flakes and Wheat Meal.

In the course of this re-design, the package itself was overhauled to obtain adequate protection at minimum cost.

Needed More Visibility

The package submitted by the Packaging Laboratory was a carton with a waxed glassine overwrap. This package brought objections from Sales and Merchandising, because the waxed glassine lessened shelf visibility. The rejected package was returned through the same channels to the Packaging Laboratory.

Final result of the Packaging Laboratory's research was the same package with the waxed glassine laminated on the inside of the carton, where it provided adequate protection without obscuring shelf visibility.

Before marketing "Minute Rice," General Foods spent over five years in development work and built three separate pilot plants. The company's objective was to prepare an instant rice for the "Minute" brand name, suitable for preparation at home by just the addition of water, followed by comparatively short cooking time. This product, like the other members of the "Minute" family—Tapioca and Gelatin—further endorses the company policy of stressing good service and convenience items for the modern housewife.

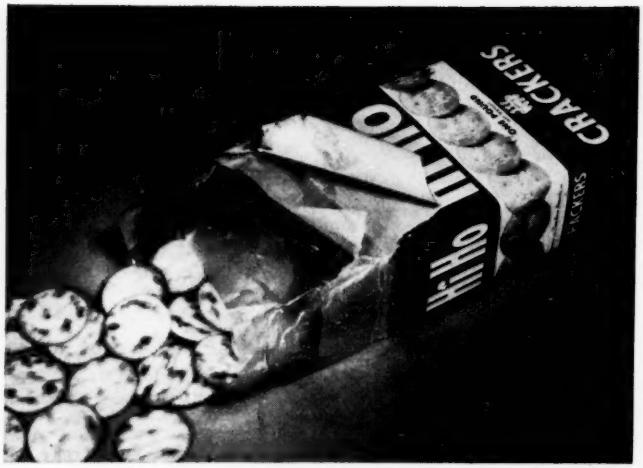
Obviously, the package for this new product called for clear "Minute" brand identification on the carton.

The packaging project was routed by management through Central Research in New York and then to the Packaging Laboratory Department of the research laboratories in Hoboken.

Simplest Proves Best

Selecting a proper package for precooked Minute Rice promised to be a severe problem. The character of the problem indicated the need for extensive testing. Many packages promising the necessary protection were tested—only to be abandoned because any package which gave the desired protection from moisture-vapor did not permit breathing. Another factor to be considered in choosing the right packaging material was that it would be one which would avoid the development of rancidity in the rice. The package finally adopted was the simplest of all considered and tested—just a carton, without bag, liner or overwrap.

During and following package development and testing by the laboratory and by Production and Engineering, the package followed the same routine as other GF packages before final approval.



SUNSHINE'S one inner, two outer wrappers seal in flavor and freshness.

4. Moisture-Tight Pack Keeps Hi Ho's Crisp

An excellent example of package development is the Hi Ho carton.

First, when a package idea is proposed at Sunshine Biscuits, Inc., it is funneled to top management. If it has merit, a combined group meeting of technical and design committees is called. This committee represents department heads of Manufacturing, Quality Control, Packaging Equipment, Baking Equipment, Public Relations, Advertising and Sales. The packaging idea, along with all the various angles which it presents, is thrashed out from each department's point of view. Such questions as, "Can we make it?" "What kind of machinery is needed?" are discussed.

Technical committeemen then tackle the job of working out the answers and determining related production costs. When their work is done, another joint committee meeting is held and the technical committee's findings are presented. If approved by all, the design committee takes over. Its recommendations are then made at another joint meeting, and all specifications are correlated and referred to Management and Legal Department.

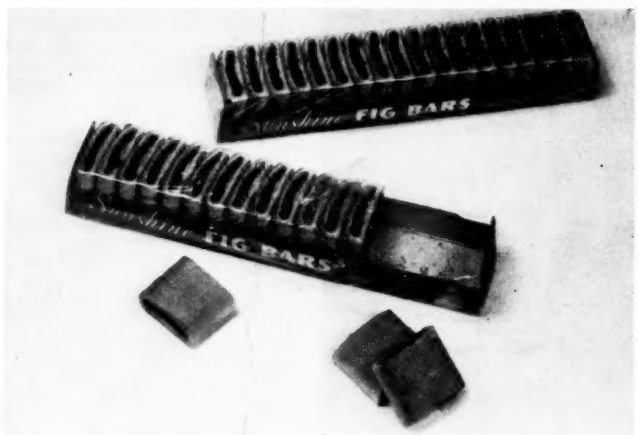
When final specifications are drawn up by the laboratory and approved by all department heads and top management, they are passed to purchasing.

Hi-Ho Crackers are a fairly new type in the biscuit industry. The particular taste appeal of this product is flavor and crispness which is gained by spraying the crackers with a vegetable oil and salt—and these very features which give the crackers taste appeal present definite packaging problems. Crackers become soggy if they absorb moisture. Salt is hygroscopic and the spray oil may oxidize, giving off-odors.

It took considerable laboratory research to develop a package meeting all these product-protective needs.

With the aid of equipment manufacturers, the Manufacturing and Equipment departments devised automatic filling, weighing, carton forming, overwrapping and sealing machinery.

The resulting package is a cardboard carton with an amber glassine inner bag. Filled and seal-folded, an outer wax wrapper tightly covers the whole carton and is heat-sealed. Overwrap of the whole unit is a glazed paper printed with reproductions of the crackers, name and brand identification, and colorful art design.



"SEE-THROUGH" wrap, over laminated tray, displays and protects fig bars.

5. "Visible" Boat Zooms Fig Bar Sales

Another Sunshine package that is a particularly interesting one is the Fig Bar package. It is the result of several changes made over many years. To fully describe the steps taken in developing this package, it is necessary to know something of the history of Fig Bar packaging. It is a striking story of the progress of food packaging since the turn of the century.

Back in the early 1900's, fig bars were not packaged but sold in bulk in glass-display-front cans in the grocery store. The cookies had little protection from contamination. They dried out quickly. Another disadvantage to the bulk container was that the housewife objected to buying the last fig bars in it because they might not be fresh. But at this time, few foods were packaged. The consumer expected no better protection than this, and sales were good.

Prior to 1920, individual packages with glassine liners and paper overwraps were developed and used by the biscuit industry. While these were an improvement, they were neither satisfactorily sealed nor moisture tight, and the cookies did not reach the consumer in the best condition.

A sales ceiling on this package arrived quickly. It was realized that the fig centers were drying out, but so had the goods when previously sold in bulk. It was decided that sales were off because the eye appeal of the bulk package had been lost and what was

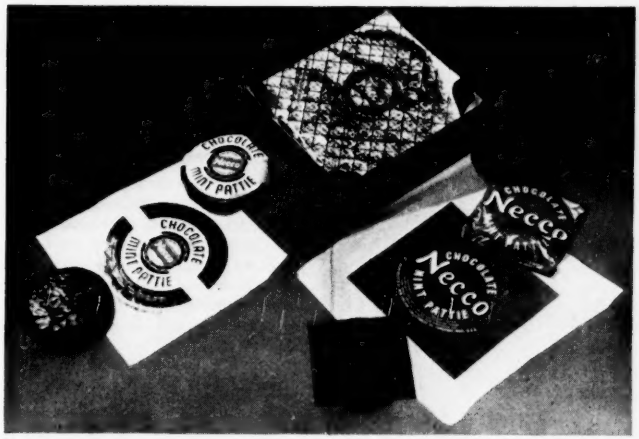
now needed was better packaging protection plus visibility.

In the late 30's, transparent cellulose packaging came to the baking industry. At this time Sunshine Biscuits put its fig bars into cellophane bags. Again quality, shelf-life, and sales improved, but bag packaging gave no protection against crushing and crumbling.

In the past 20 years, many new packaging materials have been developed. Sunshine has experimented with most of them, trying to find a good quality-control pack, including visibility that would have the appetite appeal of the original bulk line. Automatic packaging is another factor to be considered.

After extensive laboratory testing of materials and equipment, the present fig bar package was evolved. This is a chipboard boat laminated with grease-proof glassine. The boat and contents are overwrapped with moisture-proof transparent cellulose film, which is then heat-sealed.

In this new packaged form, Sunshine Fig Bars have been lifted to new heights in sales volume.



MACHINE replaces hand-wrap, speeds Necco packaging (new pack, right).

6. Square Wrap Does Trick With Chocolate Patties

The New England Confectionery Co. has been manufacturing the Necco 5¢ chocolate mint pattie for many years. In the days when foods were sold unpackaged, this piece was offered to the trade unwrapped. Then, when packaging materials were introduced, the piece was handwrapped—first with tinfoil, later with an aluminum foil.

During the war, when foil was not available, patties were hand wrapped in glassine. Before this change was made, the quality control department, in conjunction with product development, experimented on several other packaging materials as a possible substitute. Glassine was finally chosen as preferable in respect to protection of the candies, operational efficiency, and cost.

Sales of this item during the war years increased so that an accelerated production, along with machine wrapping, became a "must" if consumer demands were to be met. For these needs, a new package had to be developed.

A joint operational meeting was held to discuss a proposed new package. Sales, Merchandising, Production, Engineering, Product Development and Quality Control departments were represented at the meeting. Each department expressed its particular interests, and they were as follows:

Sales and Merchandising—Color, design, brand identification, ease of counter display, and handling of production to meet sales requirements and consumer acceptability.

Production — Increased production to meet sales needs, while coordinating with other plant operations.

Engineering—Machinery to meet sales and production interests.

Quality Control—Improvements to remedy inadequacies of the old hand-wrap, in which packaging was loose.

The Engineering Department worked out machinery specifications necessary to meet sales and production needs. These specific needs were then presented to various packaging machinery companies, and after several of the latter had made suggestions, one company was given the contract to manufacture a special machine to do the job.

This machinery manufacturer recommended the type and weight of glassine or transparent cellulose for use in the machine, and the Purchasing Department procured sample lots of both types of materials.

A pilot run was made as soon as the machine was installed. The first machine-packaged pieces were too loosely wrapped. The machine did not give a tight enough wrap on such a round piece. So these initial results were rejected by Quality Control on the basis that the loose wrap offered insufficient protection against crushing and bruising and was vulnerable to contamination.

As a remedy, Quality Control suggested the use of a treated cardboard base under the piece to offer more stability and, in turn, give a squarer shape to the package. This would also make for better stacking and display.

Base-Piece Problem

Production and Engineering, working in conjunction with Product Development, cut the size of the piece by small fractions and reduced the dimensions of paper recommended by the package machinery staff. These changes were fine—with the one exception that the cardboard base was too sharp-edged. As the machine tightly wrapped the paper around the base and the candy, the base cut through the glassine.

Product Development, via Purchasing, ordered a stronger plasticized glassine. And this worked satisfactorily in pilot test runs. Shipping and shelf-life tests were then made by Quality Control, and findings met all specified needs. Next, Product Development set up specifications for box cartons (size, weight, construction, and the like) to accommodate the shipping of the new individual pieces.

These final specifications, now okayed by Top Management, Production, Engineering, Quality Control, and Product Development, were passed on to Sales, Merchandising and Purchasing Departments to work out the final details of the new plates, art work and procurement.

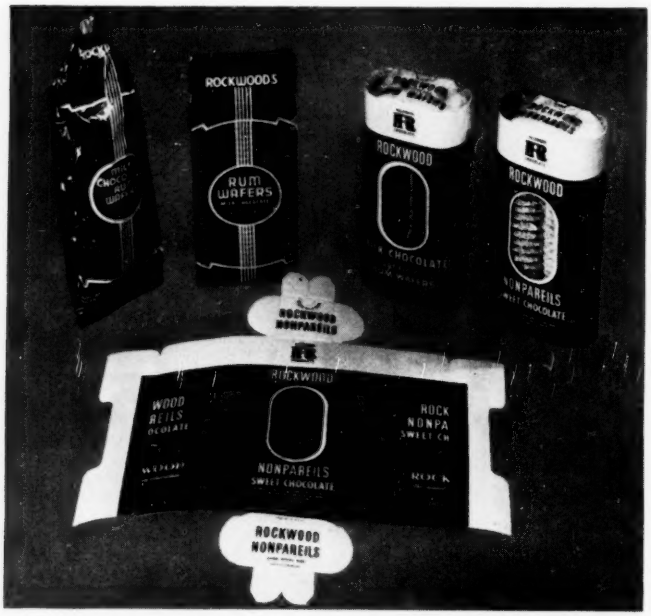
This 100-year-old confectionery company makes a wide line of candies, including count goods, bulk goods, cello bag goods, and fancy packages. Confectionery made and packaged includes chocolate covered bars, wafers, lozenges, fudges, jellies, gums, pan work, creams, nougat, marshmallows, caramels and fancy chocolates.

Development of any new package for either a new or an old product follows much the same lines as just described in the development of the

new 5¢ mint pattie package. While different types of confections present varied requirements, as far as engineering, quality control and production details are concerned, the pattern of development organizationally, is the same. All departments express their respective interest in the new package at hand, and every effort is made to produce a final "compromise" package that best fulfills package requirements.

Necco subjects all its packages to constant analysis in terms of quality control, production efficiency, successful merchandising, and sales results.

This is true even with such a successful and well accepted confection as the Necco Mint Pattie, and at present the merchandising department is conducting field sales tests to check the possibilities of even greater sales potential.



"RECAP" (left to right) of novel package development by Rockwood.

7. Unique Double-Tube Package Protects Chocolate

When Rockwood & Co. decided to package chocolate wafers, its first package was a printed transparent cellulose bag, gathered and tied in sack fashion. As good as this package was, it had its shortcomings, such as splitting and cracking. So the company adopted a double-lined transparent cellulose bag with heat-sealed ends. In both cases, the wafers were packed in two columns.

But the war made cellophane unavailable, and an emergency package had to be developed. This was a square, unlaminated, brown-colored paper-board box with a gable top closure.

Reappraisal After War

This design did not have a transparent window, so the wafers couldn't be seen, but it allowed a printed picture of the candies on the outside. The gable top added distinctiveness. But the paper board available at the time left much to be desired.

The company decided to reappraise the package. One of the immediate improvements was the adoption of glassine or parchment-laminated paperboard stock, which shielded the chocolate wafers from odors of the paperboard base and the printing inks on the outer surface.

Working together on the project were representatives of the Sales and Production departments and the Laboratory. With the war's end, some of the desired packaging materials became available, enabling the project to roll along.

Sales wanted an attractive, colorful package, catchy to the eye, which would identify the company brand immediately—a package that would stand up under mass-handling, and insure maintenance of top quality of product throughout its necessary shelf-life. Such qualities in a package stimulate high sales.

At this stage, the account executive of the advertising agency and two other outside experts collaborated. Result: A package incorporating maximum merchandising values.

Production wanted a package that could be engineered with minimum changes in processing equipment. The chocolate wafer-making machinery and the chocolate making processes had already been developed, but a completely satisfactory packaging machine had not been perfected to meet all the specifications. The problem was assigned to the Production Manager and his staff of draftsmen, engineers and machinists, who set about to design and construct packaging machines for the new job.

Versus Deterioration

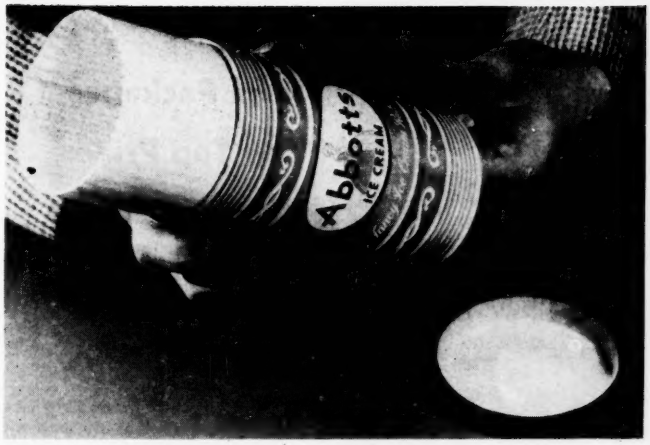
The Laboratory wanted a package that would protect the wafers from the deteriorating effects of excessive heat and light, off-flavors and odors and contamination and infestation. Packaging materials, adhesives and inks, in their various combinations, were tested according to each department's point of view.

Working together to develop this package, these departments cooperated to evolve the present carton. This is an oval carton made of printed, glassine-laminated paper-board so cut that it bends, in egg-carton fashion, to form two parallel channels or tubes with diameter sized just right to hold a stack of chocolate wafers with a minimum amount of shifting and with protection against breakage.

The lamination prevents grease-staining of the package inside and out, insures original color fastness and safeguards the chocolate from board and ink odors. The overall cellophane wrap forms a window in the die-cut board box, permitting the product to be seen. The bottom flap of the carton is glued; the top is firmly tucked in by a tab for easy opening.

Merchandising Features

Design and colored, unprinted areas have been adjusted to give minimum radiant heat absorption, consistent with the artistic requirements of the Sales Department. The package is immediately recognized by its design and style, and it is identified as a member of the Rockwood family of products. Bright green is used for mint wafers, red identifies the rum-flavored milk chocolate, and blue is used for the nonpareils. The package is sturdy and durable enough to meet supermarket merchandising and handling.



"SLIDE-OUT, NON-STICK" inner wrap makes Abbotts' ice cream easy to serve.

8. Handy Cylinder Features Fancy Ice Cream Roll

When Abbotts Dairies, Inc., developed a three-flavored ice cream roll, a new package was needed. "Fancy Ice Cream Roll" is a cylinder of ice cream containing three flavors, all three of which are extruded simultaneously to produce a cylindrical roll similar to a target in cross section.

Called for was a cylindrical package so constructed that by pushing on one end, the cylinder of ice cream would be extruded from the other end. It was necessary to have an inner wrap which would not adhere to the canister, and which could also be easily peeled from the cylinder of ice cream by the user.

Carton requirements to produce the necessary end-result were worked out. The general superintendent contacted a number of paper material and container manufacturers for sample packages to meet specifications. These were tested in production and by the laboratory. The Production Department checked the adaptability of the package to the re-designed packaging machinery. The package selected was sent to the Sales Department for determination of label requirements—color and printing.

When marketed, a weakness in the package became apparent. The chipboard disk placed in the cylinder to enable the consumer to extrude the ice cream was too thin. Sometimes the user's fingers penetrated to the ice cream.

The Production Department tested various strengths of chipboard until one of sufficient strength was procured.

MUELLER'S window carton gains product visibility, better shelf display.

9. "Stand-Up" Window Box For Elbow Macaroni

At the C. F. Mueller Co., which has been processing macaroni, spaghetti and egg noodle products for over 80 years, administrative personnel is comparatively small and ideas instituting new or revised packages are easily integrated. New packaging technics and materials are constantly brought to the company's attention by outside packaging materials and equipment manufacturers. These are channeled, via the director of purchases, to the production manager and are tested directly in the plant. Trials are also supervised by the Engineering Department in regard to plant adaptability. Package product-protective testing is handled by the laboratory.

The chief protective requirements for packaging macaroni products are protection against moisture absorption and infestation, with allowance for package to "breathe". Lab tests show that a tight wrap around the carton so closes out the air that the goods sweat.

It was found that a good protective package offsetting these difficulties is a dry wax liner in a cardboard carton.

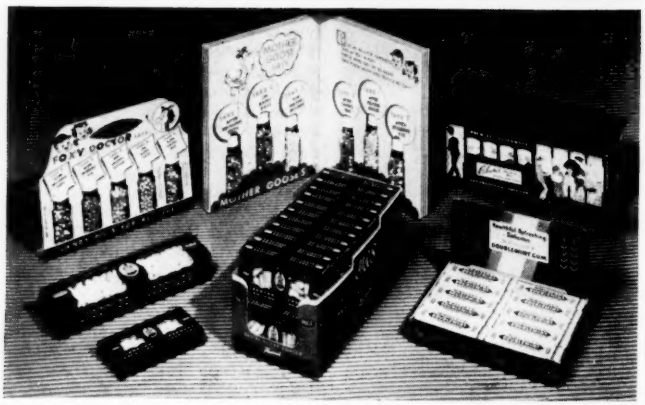
Twelve of the 13 Mueller cartons of this type are rectangular and "lay-down" in shape—over-wrapped with a printed label. The other, subject of this study, is an oblong, "stand-up" transparent-window carton.

Recently, the executive vice-president suggested that, to give better shelf display, the company change its 1 lb. elbow macaroni package from the rectangular "lay-down" pack to this new oblong "stand-up" type. Accordingly, he contacted the director of purchases, the chief engineer, and the v-p in charge of production. Jointly, with packaging machinery representatives, they worked out a packaging line.

Two machinery companies were awarded the contract—one for both carton making and sealing machinery, the other for the necessary filling and weighing equipment.

So now the new "stand-up", window-carton packaging line is in full production, and the macaroni is offered in attractive, visible display.

Reprints of this article (including packaging story, next page) available at 25c.; copies of Package Check-List at 35c.—FOOD INDUSTRIES, 330 W. 42*nd St., New York* 18, *N. Y.*



These Packages Won Top Prizes In FPBA Contest

Swift takes grand award; division firsts go to Kroger and National Licorice

OUTSTANDING packages, selected from approximately 350 entries, were honored by the Folding Paper Box Association of America at their recent 1949 annual meeting and exhibition in Chicago.

The overall Grand Prize was awarded to Swift & Co. for its line of folding boxes for Premium Frozen Meats. The outstanding feature of these cartons is artistic design. The contents of the carton are reproduced in lithographed six-color process showing the meats as they will be served upon the consumer's table. Carton units are so carefully planned that in each case the brand name is easily recognized.

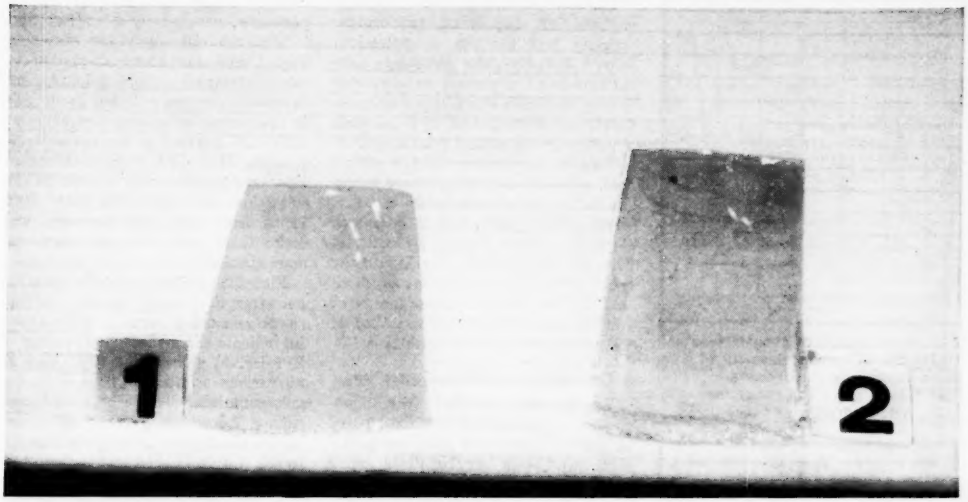
In the General Food Division, first prize went to Kroger's boxed macaroni products. These packages combine product visibility with good brand identification, excellent overall design, and illustrated recipes.

Special Honorable Mention for gift packaging was presented to the Spice Islands Co. for its decorative vinegar and combination seasoning cartons.

Other packages winning Honorable Mention were those for Armour's fresh eggs, Gumpert's cake mixes, Jewel Tea's gelatin desserts, and Steiner's egg noodles.

In the Confectionery Division, National Licorice's Y & S Lozenge carton and display took top prize. Wrigley's Gum display cartons, Blum's candy gift box and Empire Products' "Little Doctor" candy pill package received Honorable Mentions.

← **CONTEST WINNING** packages display "what it takes." Top: Grand Prize—Swift's cartons for Premium line of quick-frozen meats. Center: General Food Division—Kroger, first; honorable mentions, Armour, Gumpert, Jewel Tea, and Steiner. Bottom: Confectionery Division—National Licorice, first; honorable mentions, Blum's, Wrigley, and Empire Products.



ELASTICITY of carrageen-locust bean gum-potassium chloride gel (No. 1) is greater than that of ordinary carrageen-potassium chloride gel (No. 2), as shown in this sag-comparison. Both gels have same solids content and gel strength.

Three-Element Colloid Makes Better Low-Solids Gels

Unusual elasticity, strength, and form-retaining capacity obtained with new mix used for aspic, spice, fruit juice, and confectionery gels*

G. L. BAKER, J. W. CARROW, and C. W. WOODMANSEE

Delaware Agricultural Experiment Station, Newark, Del.

Use of Irish moss extractive with locust bean gum and a potassium salt offers a gel compound to the food industry which may be found valuable for the preparation of gelling powders or the less acid canned products such as spreads, salads, and desserts.

Unusual elasticity, strength, and form-retaining capacity are imparted to gels to a degree greatly in excess of the effects predictable from the performance of any pair of the three components used independently. The gels made with the three-element compositions have the ability to set without refrigeration, and they may be remelted and reset at will. Canned gelled tomato juice has been found one of the best products made with the new composition.

Water extractives of Irish moss (carrageen or *Chondrus crispus*) have become increasingly popular during the past few years as suspending agents in chocolate milk drinks, and as thickeners, emulsifiers, and protective colloids in many other foods.

When the war in Europe cut off a large portion of the usual source of the raw material, the U. S. Irish moss industry was backed by an urgent demand and then expanded. Upon our entry into the war, the shortage of all natural gelling agents (such as agars, gelatins, gums, and pectins) became acute, due to the loss of practically all imports. Consequently, our natural resources were further expanded.

From this background there was stimulated increased interest in Irish moss extractives for gelling purposes. And as a result of continued research, the water extractives have been greatly improved in their thickening and gelling capacities.

In this article we will describe an improved colloidal system, based on the water extractive of carrageen, which has unusual possibilities for application in the field of jellied food products.

Properties of Moss Extractive Gels

From colonial days, Irish moss has been used in puddings in the New England area. It was considered to have special nutritional values. For instance, puddings made from it were sent to the sick neighbor as a nutrient as well as a treat.

Effort was made from time to time to develop an industry based on carrageen's thickening and gelling characteristics. But no important progress was made until Leon[1] showed how either alkali or the alkaline earths could be used in combination with the extractive.

*This study was published, with approval of the director of the Delaware Agricultural Experiment Station, as Miscellaneous Paper No. 70, titled *A New Colloid Mixture for Producing Low-Solids Gels* (contribution of Dept. of Chemistry, Jan. 19, 1949). Included is material accumulated by Fellow John W. Carrow III during the period of the Krim-Ko Fellowship (Feb. 1946-Feb. 1947), and there is also data from the thesis *The Production of a Vegetable Gel*, by J. G. Jarrell, June 1948. Acknowledged with thanks are contributions and criticisms by personnel of Krim-Ko Corp., New Bedford, Mass.

THESE SIX GELS Were Prepared at Various Acidities for Aging Tests

Formula	Carrageen Extractive, Grams	Locust Bean Gum, Grams	KCl Grams	Citric Acid, Grams	Sugar to 450 Grams	pH
A	11.0	6.0	4.5	2.1	426.4	3.05
B	9.0	6.0	3.8	1.8	429.4	3.15
C	6.0	3.5	2.5	0.8	437.2	3.75
D	5.5	3.3	2.3	0.4	438.5	4.15
E	5.0	3.0	2.0	0.3	439.7	4.10
F	4.0	2.4	1.7	0.3	441.6	4.50

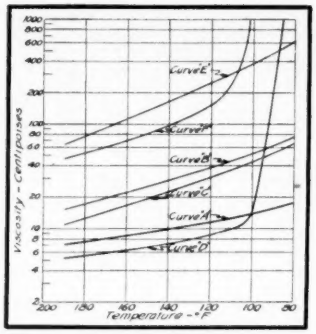


FIG. 1. EFFECT of temperature (80 to 190 deg. F.) upon viscosity of solutions containing carrageen extractive, locust bean gum, and potassium chloride, independently and combined.

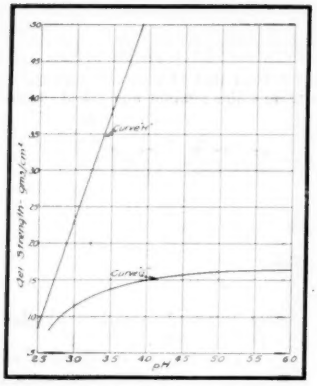


FIG. 2. GEL STRENGTHS of 40 percent soluble solids' gels are influenced by pH. Curve G sample contains 0.6 percent carrageen and 0.25 percent potassium chloride. Curve H sample has the same ingredients plus 0.4 percent locust bean gum. Potassium ion reacts more efficiently upon carrageen-locust bean combination than upon carrageen alone.

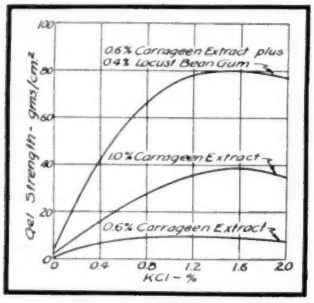


FIG. 3. INCREASING AMOUNTS of potassium chloride added to 40 percent soluble solids' gels at pH of 3.5 raises gel strengths. Highest gel strengths were obtained with the carrageen-locust bean gum combination.

The most successful of these various methods of improving gel-forming capacity was the use of potassium salts.[2,3] However, the potassium salt-carrageen gel is brittle in character (easily shattered upon applying pressure) and more like an agar-gel than a pectin or an animal-gelatin gel.

True, it has its uses in the gelling field, since its tender structure is desirable in some cases (for instance, sweet potato gels[3]), but it does lack elasticity. Since elastic, strong, and form-retaining gels are needed in many types of food manufacture, research was undertaken to discover means of further improving the gel capacity of water extractives from Irish moss.

A Three-Component Gelling Composition

The research resulted in a three-element composition consisting of carrageen, locust bean gum, and potassium salt. Upon varying the amounts of these ingredients, this composition produced gels of the desired elasticity, strength, and form-retaining capacity. These characteristics were imparted to gels in a degree greatly in excess of the additive effects predictable from the performance of the several components when used alone or in pairs.

Study disclosed that when carrageen extractive is used alone as a 0.6 percent solution, thickening takes place (as shown by the representative viscosity-temperature Curve A in Fig. 1). No jellying occurs at temperatures above 80 deg. F. Also, when a 0.4 percent solution of locust bean gum is brought to a boil and then allowed to cool, no gelation occurs (Curve B). But the solution is more viscous, and thickening takes place more rapidly as the temperature drops (compare slopes of curves).

Potassium chloride (0.25 percent) depresses the viscosity of the locust bean solution (Curve C). But, while depressing the viscosity of the carrageen solution above 100 deg. F., it causes it to gel below this temperature (Curve D).

Using carrageen (0.6 percent) and locust bean gum (0.4 percent) together, the viscosity of the mixture increases more rapidly as the temperature drops than when either ingredient is used alone (Curve E). If potassium chloride (0.25 percent) is now added to the mixture of carrageen (0.6 percent) and locust bean gum (0.4 percent), then the viscosity (Curve F) begins to increase rapidly below 140 deg. F. (Above 140 deg. F., Curve F is slightly below Curve E. It then crosses Curve E below 120 deg. F.) A tender, but elastic gel, is formed between 100 and 110 deg. F.

The curves in Fig. 1 illustrate the effect of the three components independently and together upon the viscosity of water solutions at high temperatures.

With the viscosity values shown in Fig. 1 and the above discussion in mind, let us now consider gel strengths. Locust bean gum will not form gels in 0.4 percent solution either alone or with 0.25 percent potassium chloride present. But a 0.6 percent carrageen solution containing this amount of the potassium salt will form gels. And locust bean gum (0.4 percent) will make these gels much stronger and more elastic.

Fig. 2 illustrates what happens to gel strength when 40 percent soluble solids gels using sugar and the above ingredients are made up by heating to 216 deg. F. and cooling to 80 deg. F. at various acidities. Curve G is for gels containing 0.6 percent carrageen extract plus 0.2 percent potassium chloride and sugar in the pH range 2.6 to 6.0. Curve H shows what the introduction of 0.4 percent locust bean gum does to the gel strength in the pH range 2.5 to 4.0. The improved jelly strength tester[4] was not adjusted to measure stronger gels at this time.

It will be understood from the foregoing that the potassium ion reacts to a greater degree—that is, more efficiently—upon the carrageen-locust bean gum combination than upon carrageen alone. This more efficient action is reflected especially in greater elasticity. Upon increasing the concentration of the potassium ion (other conditions remaining the same), the temperature of gelation is progressively higher.

Figs. 3 and 4 indicate the comparative strength values imparted to gels at 80 deg. F. by increasing quantities of potassium chloride when the systems are adjusted to pH 3.5 and 5.0, respectively.

Other neutral high polymers have been substituted for locust bean gum in the above system, but none with equal success.

Gel-inducing ions, other than potassium, have been tried, but none has proved as satisfactory as this element. Where greater resistance to acidic conditions has been desired in practical usage, the potassium salts of relatively weak organic acids such as acetic, citric, lactic, and tartaric have been used successfully. There is a tendency for reduced strength, however, when these acids are employed.

Unusual Elasticity Developed

The unusual elastic properties of the three-element system are illustrated in the photograph which heads this article. Gels No. 1 and 2 were of similar strength (54g. per cm.² of plunger surface, using Tarr-Baker Tester[4]), but No. 1 was representative of the three-element system. Gel No. 1 con-

tained 0.6 percent carrageen, 0.4 percent locust bean gum, and 0.4 percent potassium chloride. In addition, 0.2 percent sodium citrate and 0.2 percent citric acid were present for pH adjustment, and also water and sufficient sugar for a soluble solids content of 40 percent.

No. 2 gel, on the other hand, was representative of the ordinary carrageen and potassium chloride system—the two-element system. It contained 1.0 percent carrageen and 1.2 percent potassium chloride besides 0.2 percent sodium citrate and 0.2 percent citric acid for pH adjustment and water and sugar sufficient to make the soluble solids equal to 40 percent.

Both gels No. 1 and No. 2 were similarly made. Initial volumes were equal. They were evaporated for the same time to the same final weight. Then they were both poured, cooled, and allowed to set at 80 deg. F. for 24 hr. before measurement.

Although both gels were of almost identical volume and dimensions when in their containers, when removed they appeared as in the photograph. Gel No. 1 shows a sag[5] of 19.2 percent while gel No. 2 sags only 1.1 percent. This variance in sag or elasticity has occurred despite the fact the gels have the same breaking strength of 54g. cm.^{2}. These gels illustrate the value of the three-element system—carrageen-gum-potassium ion.

The elasticity of the gel may be varied by changing the amount of locust bean gum in the three-element composition. Fig. 5 illustrates the effect which varying of the gum component has upon elasticity of 40 percent soluble solids gels at pH 4. It is thought about 20 percent sag will equal the elasticity desired in most gels. This corresponds to the elasticity generally desired in fruit jellies by the food trade.

The resilient and form-retaining gels are not tough and are much to be preferred over the fragile and brittle gels which result when the locust bean gum is not used. These latter, the two-element gels, fracture quite easily, as evidenced by the rupture of the surface of gel No. 2 in the photograph.

Other Valuable Properties

Other characteristics of these three-element (carrageen-gum-KCl) gels are: 1. Heat reversibility, 2. gelation over a wide range of soluble solids content, 3. gelation over a wide range of pH, and 4. the ability to set without refrigeration.

Heat reversibility is valuable in canned gel products like aspic for salad, where the user may desire to remold the aspic into various shapes for greater attractiveness. Variation of solids content is desirable where one wants a salad gel of low sugar content or a dessert gel of high sugar content from the same gel powder.

A wide pH range of usage is desired so that either acid fruit juices or the less tart vegetable products may be gelled. The ability to set without refrigeration or, after gelation, to remain a gel at abnormally high room temperature, is an obvious advantage.

The stability of low-solids gels, made from the three-element composition, is possibly of greatest interest. Six sets of 40 percent soluble solids gels were made (according to the formulas in table on page 107).

About 100g. of sugar was mixed with carrageen extractive, locust bean gum, salt, and acid to act as an aid in dispersing the gum and extractive in 700 ml. of water in a 3-qt. saucepan. The powdered mixture was slowly added to the water with stirring, heated to a boil, and then boiled to 216 deg. F.

At this point, the cooked mixture was poured into standard glasses (Hazel Atlas No. 2750), filled as full as possible, covered, and sealed. The sealed glasses were held in a water bath at 160 deg. F. for 10 min. (with the exceptions that gels according to formula B were not treated and those according to D were held for 15 min.).

The vacuum created upon cooling of the glasses caused small air bubbles to develop gradually in some of the gels with a pH above 3.5. These bubbles disappeared just as gradually upon release of the vacuum.

Aging under what would approximate the worst of so-called "store-shelf" conditions (75 to 90 deg. F., but in a closed cabinet), the gels show varying strength values after different aging periods (as illustrated in Fig. 6). Initial strengths were purposely varied.

(*Turn to page* 201)

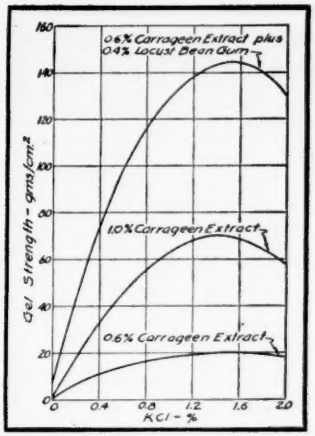


FIG. 4. EFFECT of potassium chloride on gel strength of 40 percent soluble solids' gels at pH of 5.0. Increasing amounts of potassium chloride (up to 1.4 percent) raise gel strengths higher than gels with pH of 3.5 (Fig. 3).

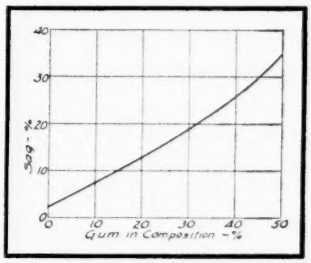


FIG. 5. ADDING more locust bean gum to three-element system increases elasticity of 40 percent soluble solids' gels.

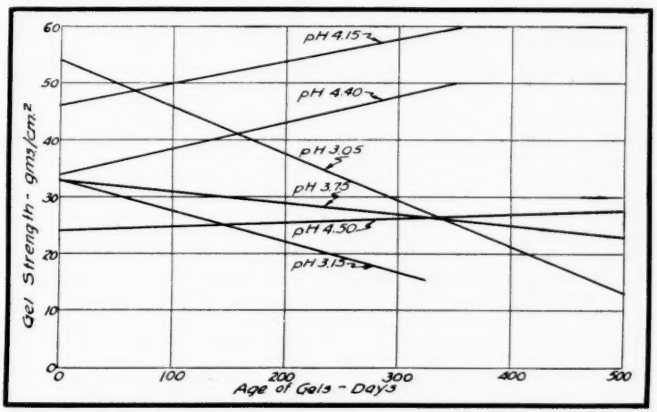
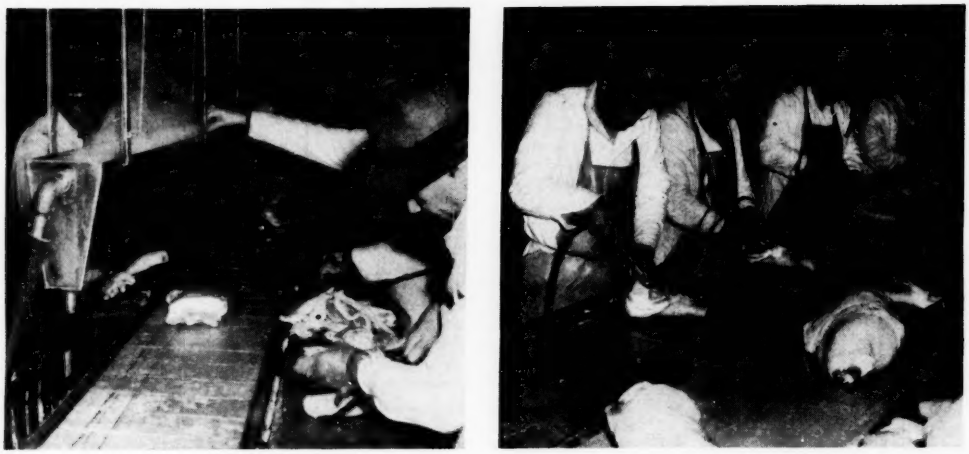


FIG. 6. GELS show varying strength values after different aging periods. These gels have a 40 percent soluble solids content and they are made up of the three-element system at various pH's.



1 TRIMMING AND PUMPING LINE. Left: Conveyor feeds shoulders to trimmers. Note worker warming knife in trough. Right: Then shoulders go to conveyor on pumping table. Workers are pumping brine into arteries.

Mechanized Handling Speeds Smoked Meat Output

High efficiencies achieved by employing long tables with conveyors on ham-washing, shoulder-pumping, and ham-packing lines

S. H. RABINOWITZ
and **RALPH GARSON**
President and Smoked Meat Supervisor, respectively, Colonial Provision Co., Boston

Pressed by growing orders for smoked meat products, yet restricted by lack of production space, our organization, Colonial Provision Co. of Boston, had to figure out a practical way to increase its output on the same lines and with the same help.

And we did it—by mechanizing product-handling on the production lines.

Careful study revealed many unnecessary handlings, each involving an appreciable amount of time and labor. These inefficiencies were particularly prevalent in the ham-washing, shoulder-pumping, and ham-packing operations.

A remedy was worked out, and it proved very effective: By shifting from ordinary stationary tables to long tables with a conveyor running through the center, production has been increased 20 to 50 percent, depending upon the specific operation.

In addition to lowering operating costs, this "switch" has paid other dividends by: (1) Making working conditions easier for employees, (2) reducing labor turnover, and (3) improving sanitation.

Three changes have resulted in better performance on the shoulder-pumping line, thereby increasing production about 50 percent. First, the triple-handling of shoulders—from trimming table to brine-pumping table and then to curing vats—has been eliminated.

Originally, shoulders were trimmed on a stationary table and then pushed to one end of it, where a worker loaded them into ham-trucks. These trucks were next hauled to the shoulder-pumping table, where they were then unloaded.

Shoulder-Pumping Now Continuous

Now, the company has arranged a steady flow of shoulders from trimmers to brine pumpers. The trimming table consists of an aluminum slotted conveyor. It is 30 in. x 24 ft., with a 2-ft. wide cutting board on either side. The 14 workers stationed at the table trim the shoulders and place them on the conveyor which carries them to the pumping table.

Second, handlings at the pumping table have been reduced. Previously, trimmed shoulders were loaded onto the pumping table and pushed to workers who pump pickle into shoulder arteries. Often, these workers had to reach out on their toes for a shoulder.

The pickled shoulders were then pushed to another end of the table, where they were then loaded into a ham-truck and finally hauled to the wooden curing vats.

These handlings have now been discontinued. From the trimming table, the shoulders drop 2 ft. through a chute onto a 2-ft. wide by 60-ft. long rubber belt conveyor that carries them along the center of the pumping table.

There are 25 operators at the table—12 on one side, 13 on the other—using artery needles to pump pickle into the shoulders. The pickle is supplied from a 1,200-gal. tank.

Pumped shoulders are then put back on the conveyor, to go to the end of the pumping table. Here, a chute drops the shoulders through a hole in the floor into a ham-truck in the basement.

The third change revises the method by which the trimmers warm up their knives to make the trimming operation faster and easier. Instead of using buckets of hot water, a stainless steel trough of boiling water has been installed on the trimming table, directly above the conveyor. The trough water is kept at boiling temperature by means of a pipe furnishing live steam.

This simple modification keeps the trimmers' supply of boiling water within easy reach. Also, a better job is done of sterilizing the knives.

Production has been stepped up 20 percent on the ham-washing line through the installation of a conveyor

2 HAM-WASHING LINE. Left: Continuous chain-belt conveyor-washer rinses cured meats. Right: Washed meats leave washer, then travel on rubber-belt conveyor delivering them to brander (left), trimmers, and stockinetters.

system specially equipped with sets of water sprays. Aside from increasing production, this installation also does a better job of cleaning cured hams and shoulders than the former method.

Ham-Washing Simplified

This automatic ham-washing line consists of a wire-belt conveyor (2 ft. x 10 ft.) enclosed in a stainless steel box. In the center of the box are the water sprays—ten sets, five above and five below the conveyor. Each set of sprays is spaced three inches apart and is arranged to play water directly on the hams.

Hot water and steam feed into the water sprays from two lines, both regulated so that the temperature of the wash-water can be set to 75-80 deg. F. Water draining from the hams is piped directly into the sewer.

Cured hams or shoulders are delivered to the washing line in 1,500-lb.-capacity ham trucks. A single operator feeds the hams or shoulders onto the conveyor, where they are washed and drained. Next, these cured items are conveyed to the rubber conveyor (2 ft. x 25 ft.), where they are branded, trimmed, put in stockinettes, and hung on smoke trees, ready for the smokehouse.

The former method of ham-washing required two men—one to feed the hams on a screen-topped washing table and the other to wash them. Washing was done by placing the ham against a brush attached to a water line.

In addition to the many handlings involved, the old, laborious method was messy. Furthermore, the washing job was questionable, and there was a chance of some hams going by unwashed in order to keep branders, trimmers, and stockinetters busy.

To double output on the smoked ham and shoulder packing line, an aluminum slotted conveyor was installed. This conveyor is 30 in. wide and 25 ft. long. On each side of it there is a 2-ft.-wide stationary stainless steel table where girls wrap the hams or tag the shoulders.

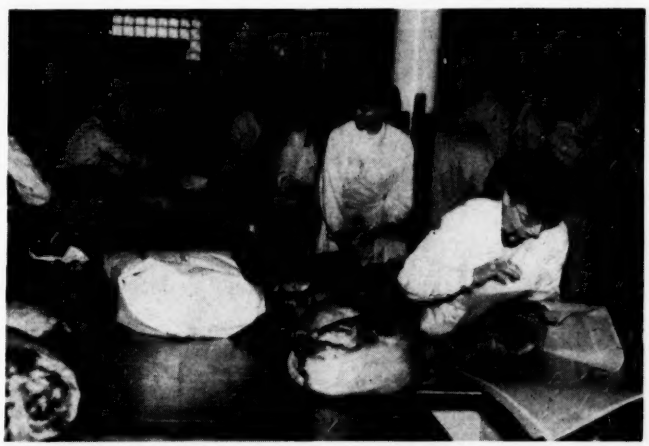
At the end of the conveyor, a diagonal metal bar diverts the hams or shoulders to a roller packing conveyor. Here, they are packed two hams or four shoulders to the carton. The cartons are then carried to the gluer and sealers.

Packaging of Hams Speeded

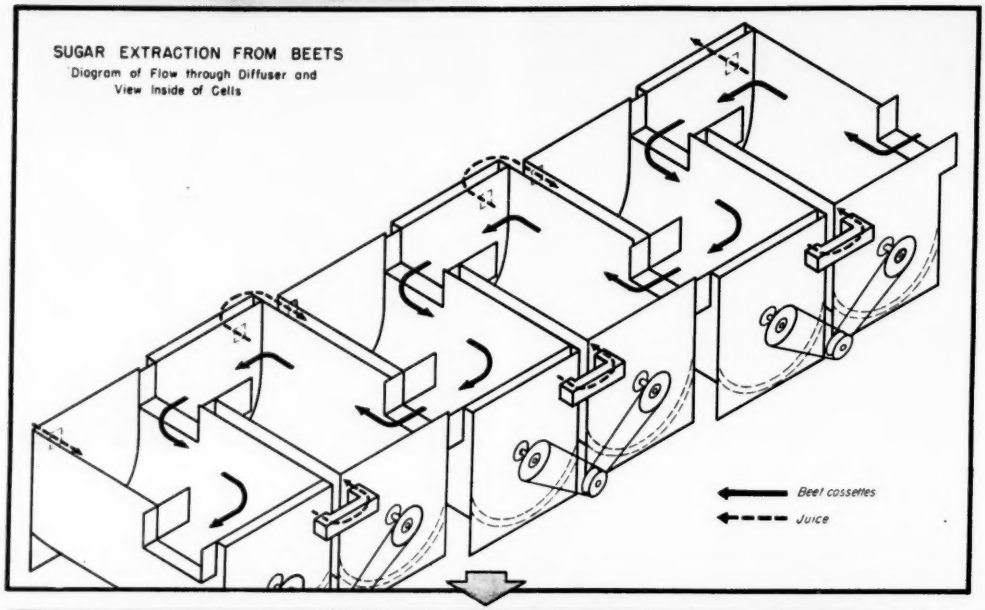
In the new upped-production system, three men feed ham or shoulders from the smoke trees onto the conveyor. When hams are being packed, 16 workers are needed—4 inspectors, 6 wrappers, 3 packers, 1 gluer, and 2 sealers. And personnel required to pack smoked shoulders total 15—6 inspectors, 3 taggers, 3 packers, 1 gluer, and 2 sealers.

Formerly, two square tables were used where the hams were inspected and wrapped. Shoulders were neither wrapped nor tagged. (Today, a circular tag attached to a deadlock brad or metal clip is employed.)

Three men fed hams or shoulders from smoke trees onto a table. Next, eight men inspected the hams. Then, three girls wrapped and packed two hams or four shoulders into each carton placed on the roller conveyor. Finally, the cartons went to one gluer and one sealer, whereas now they go to one gluer and two sealers.



3 PACKAGING LINE. Hams taken from smoke trees (rear right) are put on conveyor that carries them to inspectors and packers (foreground).



TOP: SCHEMATIC travel of cossettes. Above: Close-up of cells with lids off shows action of scrolls and transfer fingers.

New Diffuser Cuts Costs in Beet Sugar Extraction

Proved successful in pilot plant test, high-efficiency continuous unit will now be installed in commercial size in country's largest sugar beet plant

E. B. SCHMALZ
Assistant Pacific Coast Editor, "Food Industries"

Pilot plant tests conducted on a special type of continuous diffuser for extracting sugar from beets have been successfully completed at the Woodland, Calif., factory of Spreckels Sugar Co. Outstanding improvements in design have been made while retaining dialysis as the principle of operation.

During the 1948 run, the diffuser handled over 58,000 tons of beets and demonstrated new advantages of simplicity, accessibility, flexibility, and low initial cost. Labor savings over batch type operations are considerable.

Results obtained from the operation of the pilot plant have been so satisfactory that Spreckels plans a commercial-size installation at this location in

the near future. Moreover, another full size unit is to be installed at the company's Salinas, Calif., plant—the country's largest beet sugar factory.

Invented by W. V. Morton while he was in the research department of Spreckels Sugar Co., the Woodland 12-cell Oliver-Morton Diffuser was installed jointly by Spreckels and Oliver United Industries, Oakland, Calif.

Capacity Comparisons

The Woodland pilot-plant diffuser was designed to handle 500 tons of beets per 24 hours. This new 12-cell installation was used to give a direct comparison with the old 14-cell, batch type, circular battery at Woodland. Capacity varied from 279 to 650 tons during the test period.

In the old battery batch type diffuser, the cells are arranged to form a circle. Each cell is then fed consecutively from a common chute that is suspended from an overhead trolley. The cells are based on the edge of a circular pit about 12 ft. below. Spent cossettes are discharged into the pit. Juice is extracted from the bottom of the cells under pressure and pumped to the next stage of processing.

Compared to the 14-cell circular batch battery, the 12-cell continuous diffuser gave equal results at capacities of 600 to 650 tons per day. Compared to full size continuous units of 23 cells, and allowing for the difference in number of cells, the Woodland unit was estimated to give equal results at a capacity of 525 tons. Primarily, these capacity estimates were based on comparable draft and pulp losses.

Each of the 12 cells of the Woodland installation is a U-shaped iron tank fitted with a scroll-conveyor for about 90 percent of its length. Each cell is about 4 ft. in dia. at the scroll section by approximately 8½ ft. long. At the end of the scroll, but on the same shaft, are four sets of fingers for lifting and transferring the cossettes (sugar beets cut into long, thin strips) from one cell to the next. The discharge end of the cell is a perforated plate through which juice flows into the attached juice box.

Cells have removable covers, enabling ready inspection. Part of each cell body is surrounded with a steam jacket using second vapors or exhaust to maintain desired temperatures.

How It Works

Starting at the head end, where cossettes from the cutters enter the diffuser, each cell is set 2 in. higher than the preceding cell. This difference in cell height allows the juice to flow by gravity toward the head end while the cossettes move toward the tail end and are lifted 2 in. to each succeeding cell by the transfer fingers. Battery supply water is added at Cell No. 12, at the tail end of the diffusion battery.

In operation, cossettes and juice enter at the same end of each cell but from different sides. Juice and cossettes travel through the cell together the length of the 8-ft. scroll. At the discharge end, cossettes are lifted into the next higher cell while the juice flows by gravity through the perforated end into the juice box, thence into the next lower cell. Thus juice and cossetts flow concurrently within each cell but countercurrently between cells, with direction of travel reversed in each consecutive cell.

Raw juice leaves Cell No. 1 at a refractometer dry substance of about 11, ready for clarification, concentration and crystallization. In a full scale plant with 23 cells, raw juice would be about 15 rds. Cossettes leave Cell No. 12 as beet pulp with a sugar content of about 0.1 percent, ready for making into stock feed.

Pilot Plant Test Conditions

In the Woodland tests, battery supply water was heated by injection of second vapors to a normal 73 deg. C. and metered into Cell 12. Another meter was used to measure raw juice exiting from Cell 1. Cossettes were weighed into the diffuser by means of a scale and were also calculated from analysis by a material balance.

Temperatures of juices in individual cells were measured by indicating thermometers placed in the juice overflow boxes between cells.

Some corrosion of iron, particularly of scrolls, was evident in Cell No. 1, where the pH of the raw juice varied from 5.8 to 6.25 over the test period. Decreasing amounts of corrosion were noted in Cells 2 to 9. It was considered, however, that provision of corrosion-resistant materials for the parts affected would not cost too much for this type of unit.

To compare the Oliver-Morton diffuser with a full-size continuous diffuser of another type, the battery supply water was enriched by returning a portion of the raw juice so that the quantity of juice and percentage of sugar in the juice entering Cell 12 would be the same as the juice entering this cell in a 23-cell unit. In spite of shorter detention time (about 24 min. in 12-cell, 45 min. in full size unit) the Oliver-Morton pulps were comparable in sugar content and the equilibriums were satisfactory.

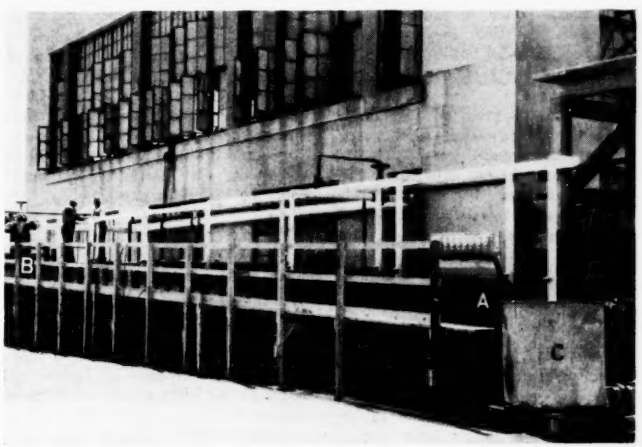
Advantages Indicated

Having only one slowly rotating element in each cell, the new diffuser is simple in design and operation. The transfer fingers give completely automatic operation throughout the battery. Removable covers make all parts of the mechanism accessible for inspection or adjustment.

Flexibility of operation to suit the requirements of any factory is supplied by variable speed drives and also by varying the size of individual cells, the number of cells, or the arrangement of cells—in one or more lines or in one or more tiers. Additional cells may readily be added to an existing unit as required.

As stated, the design has the dollar advantage of low initial cost. Labor savings are considerable compared to batch operation. A batch diffuser requires five men per shift or 15 man-days per 24 hours, while the continuous diffuser is practically self-operating.

Further development of this diffuser will be handled by Oliver United Industries.



OVERALL view of diffuser. Cossettes are received in Cell No. 1 (A), travel cell-to-cell to No. 12 (B), and concentrated juice is collected in tank (C).

DOORS leading to refrigerators (background) are just far enough apart to service one loading station. Overhead can be seen the ammonia pipes and hoses by means of which the trucks' holdover plates are charged nightly.

It's a Loading Platform—And It's a Garage

Meat packers and distributors solve truck servicing and loading problems with sheltered dock that opens on street, yet leads directly to refrigerators

A NEW TYPE of refrigerated loading dock and a new leased fleet of refrigerated trucks feature the delivery system of the Illinois Packing Co., processor of fresh beef, veal and lamb distributed to customers within a 40-mile radius of Chicago. The new loading dock along with the refrigerated truck fleet is designed to keep the company's fresh meats under constant refrigeration from the time they are taken from the plant ice box until they are delivered to the customers' places of business.

This marks a great advance in the local delivery of fresh meats, especially in hot summer weather. It is a far cry from the old days when sides of beef and other fresh meats were delivered in open-top, express-type bodies, without any refrigeration, and with only canvas tarpaulins thrown over the tops of the loads to protect from dust and dirt.

No Exposure

Even today, despite refrigerated trucks, delays in the loading operation at the packing plants frequently permit the meat to be exposed to hot, humid air for unduly long periods. This is particularly true during the summer months. The Illinois Co.'s dock is designed to prevent just such occurrences. The meats are constantly under refrigeration because the loading dock is practically an extension of the plant ice box.

How It's Built

In construction, the company's new loading dock is a long narrow platform on the ground floor of the building, with ice-box-type insulated walls about 3 ft. back from both edges of the platform and extending to the ceiling of the floor above. In these walls are ice-box-type doors, six on one side, and twelve on the other, with the doors spaced on centers about 9 ft. apart. Each door will serve one truck. Thus, if it were ever necessary, 18 trucks could be loaded at one time.

Overhead Rails

The space inside the two platform walls leads directly off a door in the main plant ice box. Connecting ceiling rails and hooks move meats from inside the main ice box down the entire length of the loading dock, through the platform wall doors, and across the edges of the platforms into the truck bodies.

Temperature maintained in the main ice box is 36-38 deg. F., while the space between the loading dock walls is refrigerated from 45 to 55 deg. F. Since the interiors of the refrigerated truck bodies are maintained at 36-38 deg. F., all the meats are under refrigeration until finally delivered.

The side of the loading dock that has the six doors opens onto an alley in the rear of the building. The other side of the dock, with the twelve doors, runs parallel with the front of the building and is set back from it about 30 ft. In the space between the edge of the platform and the front line of the building, there is a floor area opening onto the street. This area is closed in by four 14-ft. high, power-operated doors.

With the doors opened, twelve trucks —the company's entire fleet—may be backed up to the dock at one time and loaded as desired. Moreover, the trucks are garaged overnight in these loading positions and serviced and washed without moving.

12 Unit Fleet

The fleet is made up of ten Diamond-T cab-over-engine trucks with 12-ft. long insulated and refrigerated bodies, and two Diamond-T's with 14-ft. bodies of the same type. These trucks are leased from and maintained by the Sherman Cartage Co. of Chicago. The latter's name, however, does not appear on the vehicles.

WHEN GARAGED for the night at their loading stations (inside), the trucks are fully serviced while being loaded for next day's deliveries. Trucks were posed outside the overhead doors for this fleet picture.

This leasing arrangement leaves the maintenance of the trucks in trained automotive hands and permits the Illinois Packing Co. to concentrate on the processing and sale of its products.

Bodies of the trucks are insulated with Wilson Hair Craft—2 in. on the sides and ends and 3 in. in the roof. The floor is of oak, 2 in. thick.

Adequate Refrigeration

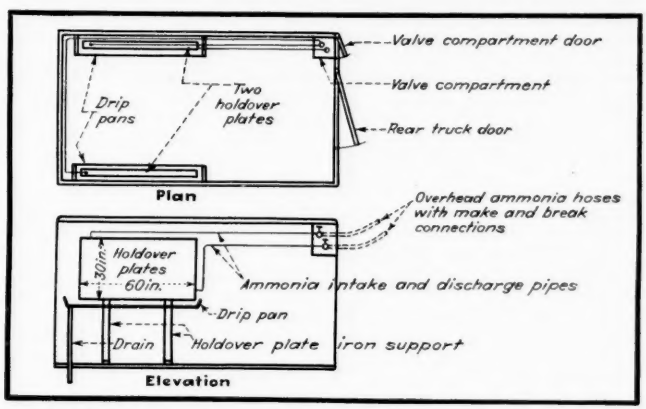
Each truck is refrigerated by means of two Dole holdover plates inside the body. The company's plant ammonia system charges the plates at night while the trucks are backed up to the loading dock.

This service is handled by overhead ammonia hoses, with quick-acting make-and-break valves, hung from the ceiling along the edge of the loading dock. The hoses are connected with supply and discharge pipes terminating inside a small box on the inside of the rear end of the body. An overnight charge of the plates is sufficient to hold the body temperature at 36-38 deg. F. for from 10 to 12 hours of daytime operation.

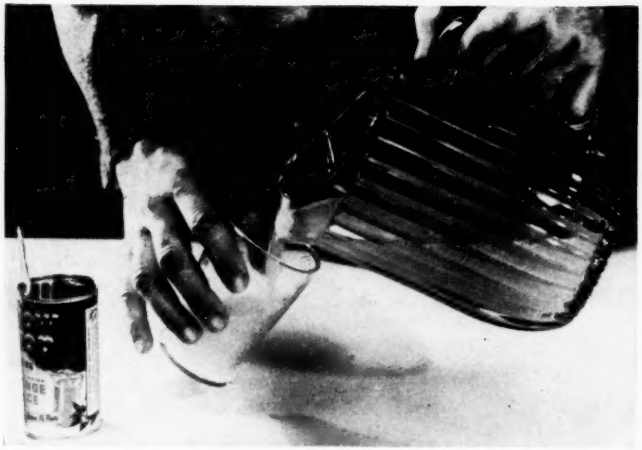
The bodies were built by Holland and Libanoff, Chicago. Payload of the 12-footers is 8,000 lb.; that of the 14-footers, 12,000 lb. Truck bodies, cabs and motor hoods are painted a bright yellow, with the chassis and fenders black, the wheels red, and roof aluminum. The lettering and trademark are in contrasting black and gold leaf for both striking and pleasing appearance.

The 40-mile delivery radius extends on the north to Highland Park and Libertyville, Ill.; on the south to Gary, Inc.; on the west to Aurora, Ill.

LEASED TRUCKS carry the company's name, though the packer is relieved of all maintenance chores in distributing his meat products over a 40-mile radius.



ARRANGEMENT of Dole ammonia-charged holdover plates inside truck body.



HIGH QUALITY WITH SIMPLE PREPARATION accounts for orange-juice product's popularity. Concentrate and three cans of water go into pitcher, mix is poured back and forth for aeration—and drink is ready.

Frozen Orange Juice Concentrate Already Hailed As a Leader

Processors multiply as new citrus juice product wins wide acceptance. Bolstering of whole industry seen, also adaptation of idea to other liquid foods

IVAN C. MILLER
Editorial Consultant, "Food Industries"

With consumer acceptance of frozen orange juice concentrate mounting rapidly, it looks like this newcomer to the field will be a pace setter for the entire frozen food industry.

In fact, packers at the recent Frozen Food Convention in Chicago report that in some areas sales of this new product have been more than double the combined volume of peas and strawberries—which for years were the fastest-selling frozen items.

Because of high quality and moderate cost, the frozen concentrate should be a boon to the whole industry. And it might be added that the industry needs a quality leader to help reaffirm its prestige, which has suffered as a result of over-production of inferior quality foods.

Four or more companies will process the juice in Florida this season, and probably a dozen more will be in operation there next year.

Industry representatives have already had several conferences with USDA officials to consider setting up minimum quality standards. As protection against newcomers entering the market with inferior products, standards might prove very effective.

The Florida frozen juice concentrate processors have already adopted their own arbitrary standards of quality, based on the U. S. Bureau of Plant Industry findings.

Accuracy of these findings has been demonstrated by the immediate and continued public acceptance of the concentrate. From the very start, the demand has been more than the processing plants could supply. (For details of the manufacturing process, see FOOD INDUSTRIES April and October 1948 issues.)

Standards adopted by the concentrate processors require that reconstituted orange juice—made by adding three cans of water to one of concentrate—have a total solids-acid ratio between 12.5 and 18.5. In general, the finished concentrate blend is standardized at a 14-1 ratio. This is more than 50 percent above the minimum for canned juice.

To meet such high standards, the fruit must remain on the trees until chemical analysis of samples indicates it is ready for harvest.

U. S. Bureau Research

Taste tests on citrus fruits have been conducted over a long period by the U. S. Bureau of Plant Industry at Orlando, Fla. Both temporary and sustained panels have been employed. Flavor determinations of these panels were coordinated with chemical analysis of the samples.

The charts which plot the findings of these lengthy tests indicate when fruit should be harvested to obtain the greatest market acceptance on the basis of flavor. Interestingly enough, the vitamin content and food value curves practically coincide with taste preference curves.

Chemical analysis of orange taste-test samples revealed that the sugar-content curve angles up in almost a straight line long after harvest normally begins. The acid content curve rose to a peak after harvesting had started and later curved downward. From the time the acid content curve starts down, the solids content-acid ratio increases rapidly.

The ascorbic acid curve follows closely the sugar curve until late in the season. The taste preference of the panels was for fruit which remained on the trees until the ratio of total solids to citric acid was 12-1 or higher. Fruit was judged to have the best flavor when the ratio was between 12-1 and 18-1.

Minimum standard for canned Florida orange juice requires a solids-acid ratio of 8.5-1 or better. Most canned juice is near the minimum unless fortified by added sugar.

Quality Control

Sanitary requirements of the concentrate processors are on a level with those required for the milk industry. Quality control is necessary at every step in the process. No micro-organism growth is tolerated after the juice is extracted. Incoming raw material must likewise be controlled. Loads of fruit are sampled at the plants and analyzed for quality. One plant uses automatic sampling which selects one out of every 100 oranges as the fruit enters the plant.

Every precaution is taken by these processors to insure highest quality in fruit and finished product. Labor incentive plans based on level of sanitation maintained in the plant have been introduced to prevent any loss of original quality.

The quality of the growers' fruit is determined from samples analyzed in a laboratory operated independently of the company. Growers are paid a

(*Turn to page* 200)

We Think . . .

▪Chemical Hazards Pose an Important Food Law Problem

Most of us have thought that every conceivable type of precaution for public protection is provided by the Food, Drug & Cosmetic Act. Recent experience with hazardous use of lithium chloride savoring agents as a substitute for salt suggests that perhaps there is a loophole in the law.

If this chemical be regarded as a new drug, as perhaps it should have been, there would be no justification for such experimental usage without full clinical investigation and official authorization by F&DA. But there is no comparable section restricting the use of new food materials. The question now arises, should there be?

If Congress should enact a provision restricting "new foods" until they can prove their right of existence, there are three situations which might develop. An over-zealous or fanatical official attitude could make such a provision an unreasonable restriction on the development of new products. A slovenly or negligent administration by Washington could make the provision of no value. The third or middle course would mean that before a new food usage differing radically from all previous custom be undertaken, this use would have to prove itself, through careful clinical study.

We are inclined to believe that F&DA would follow the sensible middle policy.

This problem is so new that FOOD INDUSTRIES is most reluctant to recommend such a radical and potentially restrictive amendment to the law without further evidence. But we do believe that the present evidence makes it clear that some "new food" restriction deserves thoughtful consideration.

In our opinion, a workable first step would be an amendment of the regulations regarding dietary foods. If those regulations can be extended to include things like lithium chloride—a legal question which only the courts can answer with finality—then perhaps we will find adequate public protection without needless new burden on proponents of proper new food components.

Or the law might be modified slightly to give the Commissioner the right to define dietary foods to include "non-food" chemicals or materials which might be utilized for any proper reason to affect the palatability or digestibility of the food. Then any newly proposed substance like lithium chloride could be required to prove itself before it becomes eligible for use.

Related problems are raised by the presence of other chemicals in foods, such as antioxidants and insecticide or fungicide residues. We conclude:

1. Food must contain no harmful ingredients.
2. The burden of proof of ingredient harmlessness is properly on the food manufacturer and distributor.

▪You Must Be Well Informed to Keep Up With the Parade

Those who get around in the food industry realize that food technology and engineering are moving ahead at a greatly accelerated pace. Important changes are occurring rapidly, and even more important ones are pending. Things are happening in individual branches of the industry which will affect other branches and sometimes the industry as a whole.

Obviously, men in responsible positions must keep informed of these developments. But this cannot be done by casual reading or by an occasional chat with a few friends in the field. The job is much more serious than that. It requires a systematic review of both scientific and technologic literature. Furthermore, it necessitates frequent travel to conventions and participation in technical gatherings of both trade and pure scientific nature.

We believe that any company budget which does not provide generously for the travel of the technical staff is probably "penny wise." Both the operating men and those in research or development work must get out among their fellow technologists and scientists in order to keep abreast of rapid moving industry. It is not enough to let such people go once a year to one meeting of one society. The arts with which they must keep acquainted can be discovered and studied only by wider contact and acquaintance than that.

It is important that both the specialty societies and the scientific organizations be included in the convention activities of technical men. Incidentally, this travel not only gives important new technical aid but develops a freshness of approach to problems and eliminates the nervous fag of day-to-day responsibility. Professional development of technical staffs is an investment in company progress, not an extravagance.

This leads us to a timely suggestion: While it may be a long way from your headquarters to San Francisco, your company would be wise to send a representative to the Institute of Food Technologists meeting there in July. We have seen the tentative list of papers to be presented, and the program—to borrow a word from California—is colossal.

▪Consumers Should Be Educated Not To Heat Food in Closed Cans

The death of a young man in New York by gas escaping from a stove that had been broken by an explosion of a can of beans recalls a domestic hazard that is all too common, but seldom made public. The hazard arises from heating canned foods by direct heat fire without puncturing or opening the can.

Disastrous methods of heating pork and beans, spaghetti, plum pudding and other ready-to-eat foods are legion. A lone camper once warmed up his can of pork and beans in the coals of an open fire, tried to get it out with a forked stick. It exploded in his face burning him severely.

A housewife once heated a can of soup inside the gas oven! The can exploded in a few minutes, wrecking the stove, spraying soup all over the kitchen. Fortunately, she was not injured.

Another housewife warmed up a can of spaghetti in a

pan of water, and allowed the water to boil away. The can exploded from internal steam pressure. She suffered grievous burns and partial loss of vision.

One of the latest of such accidents was fatal. As reconstructed, a young man started to heat a can of pork and beans in a pan of water, went into the living room to relax, fell asleep. In time, the water boiled away and the can quickly developed enough internal pressure to explode, wrecking the stove and permitting cooking gas to escape. He was asphyxiated.

Makers of canned foods would do well to begin an educational campaign to stop future attempts to heat their foods in sealed containers. Any consumer-size can of food will withstand internal pressures up to about 30 to 50 psi. But if the can is heated over an open flame, the pressure will build up to a point where the container will ultimately burst.

Any one who has blown up cans experimentally by "dry heat" can testify to the astonishing violence and damage from such explosions. While it is true that, as long as a closed can is in boiling water, only trifling internal pressures can develop, it is equally true that the water in the pan can boil dry in a surprisingly short time. After that the can becomes in effect a miniature boiler *without a safety valve!*

A concerted effort should be made to educate the public never to heat a closed can over an open fire or an electric stove. This domestic hazard should be eliminated.

▪ Frozen Orange Juice Boom Is Tribute to Technology

It is not often that a product as "hot" as the fast-moving frozen concentrated orange juice hits the food market. Nor do we frequently see a new process with such widespread potential application as that which made the frozen concentrate possible.

This new product and process are the happy endings to a long story in food technology. Over the past two or three decades, a lot of technical brain power and cold cash have gone into projects for producing a "ready-squeezed," packaged top-quality orange juice which could be distributed nationally at a price consumers could afford to pay.

But that fresh-juice taste proved exasperatingly delicate and difficult to retain. It took years to perfect plant-scale juice extraction to a point where the juice compared in taste value with that from a home squeezer. And it took years more to develop a process that preserved that quality until the product reached the consumer. Perhaps it required even the impetus of a world war to pave the way to success, for the frozen product is an outgrowth of unfrozen concentrate which was produced in large quantity during World War II.

Here, then, is an example of technological achievement at its best—an extremely difficult problem solved through creative thinking and a great deal of perseverance. And here, too, is a demonstration of the manner in which such achievement pays off—a booming business which will reward the processors, greatly help the growers, contribute to the enjoyment and health of consumers, and speed technological progress in other branches of the industry. Significant, too, is the fact that the frozen concentrate will boost the sales of other frozen foods by acting as a leader which attracts new customers and brings old ones more often to the frozen food stores.

But there is one potential hazard in the booming business of concentrating and freezing orange juice. That hazard is a possible lack of attention to high quality. The pioneers in the production of the frozen concentrate know that top-quality is vital, and they guard it all the way from the raw material to the finished product. But a lot of other companies are climbing on the bandwagon, and in their haste to cut themselves a slice of this booming new business some may not maintain the high standards which have been observed to date. If the newcomers fail to put quality control uppermost, they not only will themselves suffer but will harm the entire industry. There have been enough examples to prove that second-rate processors can damage the frozen food business.

No company which is smart will enter the frozen concentrated orange juice business without a firm determination to maintain quality standards at least equal to those of the companies which pioneered the new product to outstanding success.

▪ Man-Hours Better Than Dollars as Yardstick for Progress

The cost of food processing must be lowered to protect profits and broaden markets. This problem is easily recognized, but not so readily solved. One of the things that makes cost cutting difficult is that oftentimes we don't have the right yardstick to measure progress at each step in our processing. But a good yardstick is available.

Too often factory superintendents and managers use only the dollar index to measure efficiency at each stage. That in balance-sheet language is significant. But it covers up the more important responsibility of reducing man-hours per unit of product, especially in times like these when wage rates are changing, generally up.

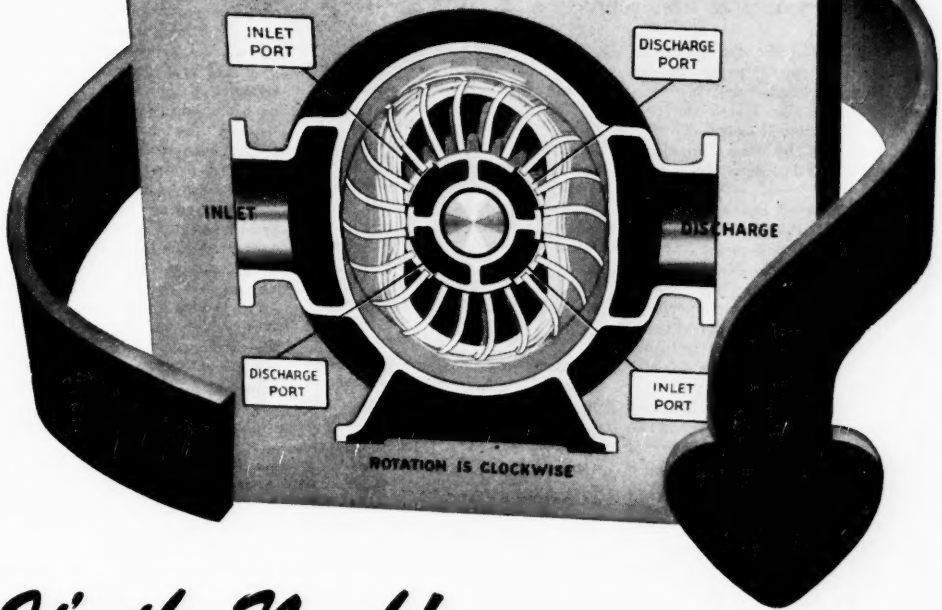
For each individual step in processing—from the inbound freight track to the outbound truck load—we must now analyze man-hours per unit of product. This is essential because the man-hour is becoming one of the most costly items purchased. And for social reasons, regardless of inflation, we can expect that this trend will continue indefinitely. We must therefore measure against the primary standard of the man-hour rather than the dollar. We'll hear about the dollars from the bookkeeper and the board of directors. But the news and the comment will be much more pleasant if we have kept man-hours per unit at the lowest practical level.

If we use this yardstick, we shall find that the most effective means for progress in lower time requirements will be mechanization, both by better machines and machine substitutes for manual effort. We have technical knowledge of mechanisms and mechanization far beyond present application in most of our factories. Even our newer plants of last year could be made better because of this. The job is one for continuous investigation. And there must be continuous pressure on top management for the wherewithal to put the best practice promptly into a plant.

Two advantages will come from alert and aggressive action. We shall serve our employers and stockholders better. We shall serve also the customers and the general public. Incidentally, we can then pay better wages without the threat of bankruptcy, meanwhile expecting and getting more skilled personnel for the more technical jobs.

Amid the financial hubbub over the cost of living, we must not forget this basic technical job, which is ours.

This is Why the Nash is the Most Simple Compressor



It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY
31 WILSON, SO. NORWALK, CONN.

Convention Reports

Reveal Meat Study Results

Institute's reorganized council on research discusses nutritional values at first conference

A symposium on the role of meat in nutrition, and general papers on the processing, packaging and biochemistry of meats, constituted the program for the first Research Conference sponsored by the Council on Research of the American Meat Institute.

The Conference, under the chairmanship of H. S. Mitchell, Swift & Co., was held on the campus of the University of Chicago, March 24 and 25, and was attended by over 200 invited technologists, plant operators and research workers from meat packing companies, universities and government agencies having to do with meat industry research projects.

E. E. Rice, Swift & Co. Research Laboratories, Chicago, reported on the changes in the vitamin content of meats that occur when carcass meat is converted into retail cuts or processed meats. Particular emphasis was put on changes in niacin, pantothenic acid, riboflavin and thiamine values, with some attention to losses of Vitamin A, pyridoxine and folic acid. Dr. Rice summarized his findings by stating that unless heat processing is involved, operations commonly used by meat packers result in negligible vitamin losses, with the exception of niacin in some types of meat such as pork and lamb.

When cooking or heat sterilization is used, thiamine losses are proportional to the temperatures used and the duration of the heat treatment. Losses of pantothenic acid, pyridoxine, and folic acid probably parallel those of thiamine. However, even with severe heating, losses in riboflavin and niacin seldom exceed 10 percent.

Loss Not Serious

Since only a small amount of total meat produced in the United States is subjected to severe heat during processing and since sausage, cured and smoked meats receive mild treatments, Dr. Rice concludes that most meat packing operations do not seriously reduce the vitamin content of meats.

The value of animal meats in the human diet was covered from the standpoint of protein, vitamin and fat constituents.

U. D. Register, University of Wisconsin, called attention to the meager amount of information on the availability of proteins and vitamins in processed foods and cited results obtained by a study of U. S. Army rations K, 10-in-1, and C-2. Rats and monkeys did not grow normally and rats failed to reproduce when the rations alone were fed to determine utilization of complex food mixtures by animals. Good growth was obtained with rats with addition of a mixture of B vitamins and 5 percent casein.

"B" Supplements

Studies to determine which B vitamins and which amino acids might replace the B vitamins mixture and casein as supplements indicated that: 1. Pantothenic acid and pyridoxine, when used with 5 percent casein, account for the growth activity obtained by the B vitamin mixture and C-2 ration. 2. Methionine appeared to be a good substitute for the casein supplement with the C-2 ration. 3. Pyridoxine satisfactorily replaced the B vitamins mixture when the 10-in-1 ration was supplemented with casein. 4. Lysine, isoleucine and methionine or cystine, when used individually, satisfactorily replaced 5 percent casein, but were ineffective when used together.

Conclusions were that: 1. Effect of heat treatment on amino acid content and extent of liberation of amino enzymes play an important part in the biological value of the proteins in the rations, representing mixed processed foods. 2. Cystine content of the casein was greatly reduced during prolonged heating, and rate of liberation of eight of the essential amino acids by enzymic digestion was appreciably decreased. 3. Over-heating of soya oil meal not only decreased the rate of essential amino acid liberation by enzymic hydrolysis, but also effectively reduced the lysine, arginine and tryptophane content. 4. Presence of reducing sugars in foods containing proteins may largely account for the low tryptophane content of the proteins in rations K and C-2.

B. F. Daubert, University of Pittsburgh, reviewed the role of fats in the human diet and commented that despite the extensive literature on fat digestibility and absorption, most of the real problems of fat absorption remain unsolved. Some of the factors affecting fat digestibility include melting point, stearic acid content, presence of calcium and magnesium in the diet and species differences. He also noted that the choice of fat as part of the diet is one of personal preference and is usually based upon the particular flavor to which one is accustomed.

With the possible exception of lard and butter, he said, bland fats are preferred by the greater portion of the American population. For that reason, refined and deodorized fats are most acceptable.

B. S. Schweigert, American Meat Institute Foundation, reported results of studies showing that vegetable protein concentrates, such as soya oil meal, are extremely low in the unidentified "growth factors", while animal protein concentrates, such as fish meal, liver, meat scraps and milk, are excellent sources of these factors commonly designated as "animal protein factors."

He stated that from the standpoint of overall nutrition there should be a wide variety of foods in the diet including liberal quantities of foods from animal sources. Latest evidence shows that vitamin B_{12}, a crystalline, cobalt-containing compound, functions to replace the growth-promoting effects of liver extracts and fish solubles for rats and chicks and has marked anti-anemia potency for treatment of pernicious anemia patients. He discussed the relation of vitamin B_{12} to other "animal protein factors" and indicated that the vitamin is likely to occur in several forms, which may vary in activity for animals and micro-organisms.

Results of New Program

When the American Meat Institute launched its new research program, last fall, the reorganization and expansion of its former technical committee into a Council on Research was recognized by the industry as both a challenge and an opportunity.

The two-day conference reported here is the first notable result of this ambitious program. Because it offers studies that are of such wide interest to the entire food industry, as well as to all meat processors, FOOD INDUSTRIES has devoted as full a coverage as its limited space would permit.

—The Editors

As the lead-off speaker in the sessions devoted to general papers, H. O. Halvorson, Hormel Institute, University of Minnesota, summarized the Institute's work on factors contributing to the keeping quality of canned bacon. For good eating as well as good keeping properties, the experimental work showed that the salt content should be 2½ percent, that the moisture content should be decreased to give a ratio of 7 to 4 with the salt content, that the bacon should have an equilibrium vapor pressure of 28 mm of mercury, or less, at 37 deg. C., and that enamel-lined cans be used.

These conditions do not inactivate the lipolytic enzymes responsible for the hydrolysis of fats and the formation of free fatty acids. (Details of procedure followed at Hormel Institute were covered by John A. Ulrich in FOOD INDUSTRIES, Jan. 1949—Ed.

George Garnatz, Kroger Food Foundation, Cincinnati, summarized the salient practices to be followed in packaging fresh, cured and ready-to-eat meats:

1. Selection of packaging material to be practicable in terms of application, durability, appearance and visibility. 2. Use of semi-moisture resistant wrapping to avoid sliming, development of off-odor and discoloration. 3. Maintenance of cutting room at 56 to 60 deg. F. 4. Exposure of cut meat to atmosphere for at least 15 min. for optimum color development before wrapping. 5. Use of backing board or tray of type that prevents "pan-burning" and accumulation of meat juices in the package. 6. Holding sales display at 30 to 34 deg. F. 7. Protection of sales display against color deterioration by light, especially that in the ultra-violet range.

Reports on Canned Bacon

G. H. McDonell, General Research Laboratory, American Can Co., Maywood, Ill., stressed the importance of selecting the proper metal containers for the packaging of canned meats. Economic value of meat contents warrants special care in selection of can because a large number of damaged or spoiled packages represent a considerable economic loss as well as nutritional loss. He said requirements to be taken into account are:

1. Quality of tinplate in cans, particularly with respect to corrosion resistance and strength. 2. Type of can enamels or organic inner surface coatings to prevent product discoloration, internal corrosion of can, and reaction with contents of can. 3. Composition of sealing compound for can lid that has resiliency over wide temperature range and is resistant to processing conditions, to fat penetration and to solvent action. 4. Quality of lithography for resistance to retorting conditions, can washing detergents, high pressure sprays, and mechanical scratching or abrasion. 5. Plant operation to obtain correct filling of cans, proper sealing of cans, correct retorting, right degree of cooling and protective storage of filled as well as open empty cans.

H. S. MITCHELL, Director of Laboratories, Swift & Co., was chairman of the first research conference, sponsored by the American Meat Institute, held at the University of Chicago.

G. M. Dack, Food Research Institute, University of Chicago, reported on research work done in cooperation with Q. M. Food & Container Institute for the Armed Forces, which shows that *Clostridium botulinum* spore suspensions incubated at 37 deg. C. have a greater heat resistance than those incubated at 41, 29, or 24 deg. C.

The work also confirmed observation of other research workers that the thermal death times are higher when the heated spores are tested for viability at 24 to 29 deg. C., as compared to those incubated at 37 or 41 deg. C. Addition of yeast and thymus nucleic acids to *C botulinum* cultures did not influence the heat resistance of the spores. Spores suspended in solution of high sucrose content showed increased thermal tolerance, while addition of large numbers of vegetative cells to *C. botulinum* spore suspensions showed no effect on the thermal death time of the spores.

C. botulinum spores grown in raw meat preparations tend to be less resistant to heat than those grown in cooked meats, probably because of inter-relationships of oleic acid, lipase and albumin in meat preparations.

J. M. Ramsbottom, Swift & Co. Research Laboratories, summarized results of experiments to determine the influence of the following factors on the freezing rate of meats:

1. Kind of meat—beef, lamb, veal and pork. 2. Age of meat. 3. Amount of fat in the meat. 4. Grinding. 5. Size and thickness of meat cuts. 6. Package materials used. 7. Air velocity in freezing area.

Check Freezing Rate

The freezing rate was determined by the size and location of ice crystals in the meat and by the length of time required for the temperature to drop through the zone of maximum ice crystal formation (30 deg. F to 25 deg. F.). Results obtained:

1. When beef rounds were frozen in an air blast at −25 deg. F., ice crystals ranged in size from small, within the fibers of superficial lean, to large between the fibers at a depth of 4 in. 2. Meats containing high percentage of fat tissue froze more quickly than did meats containing very little fat tissue. 3. Beef, lamb, pork and veal froze at similar rates when allowances were made for differences in the fat and moisture content. 4. Aging and grinding of beef did not significantly change the freezing rate. 5. The freezing rate of meat progressively increased with the increase of air velocity from less than 50 ft. min. (natural air movement) to 200 ft./min. and to 500 ft./min., but the freezing rate was not materially changed by increasing the air velocity from 500 ft./min., to 1,500 ft./min. 6. The freezing rate of the meat decreased with any increase in the insulating value of the package.

Medical Recognition

Frederick J. Stare, Department of Nutrition, Harvard University, stated that progressive surgeons are trying to get high quality protein foods in generous amounts into their patients as soon as possible. Physicians and surgeons, he said, are beginning to recognize the important nutritional value of high proteins during convalescence and are emphasizing diet prescriptions to patients with the same emphasis that they apply to prescriptions for any other medication.

Ruth M. Leverton, University of Nebraska, reported results of feeding studies with young babies and infants on control diets and on meat diets. The children on meat diets showed better growth and lower incidence of illness from colds.

Conference Part of Program

The two-day conference represented another step in the expanded and forward-looking research program of the American Meat Institute. It was the most notable result, to date, of the reorganization, last fall, of the former technical committee of the Institute into the new Council on Research.

Coffee, USN

Navy has been producing its own blended variety since early 1942

Commercial coffee producers have had rough going in selling their product to the armed forces in the Pacific area since 1942. The reason is that approximately 13,500,000 lb. annually have been coming from the Naval Supply Center, Oakland, Calif., since that year.

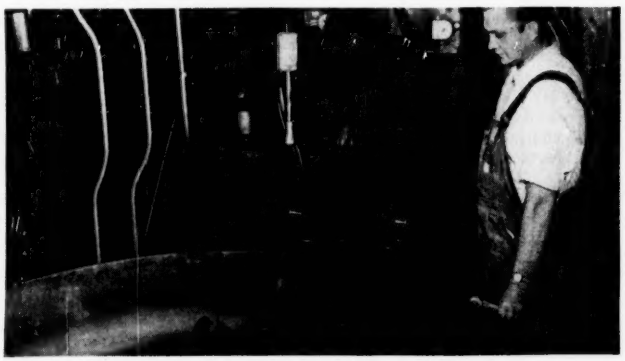
Packed in tins after roasting and blending, the coffee has been supplying Navy, Army and Marine Corps installations west of the Rockies.

About 16,000,000 lb. of green coffee beans from Central and South America are processed each year. Here is the procedure: Segregated immediately upon arrival at the plant, samples of each are brought to the tasting room. Here the samples are roasted, ground, cupped, and then recorded in order that the most desirable blend may subsequently be determined.

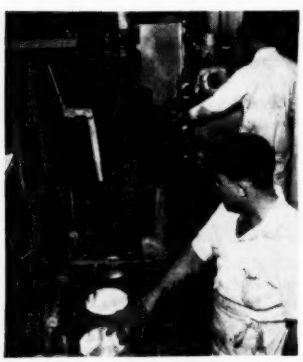
These pictures depict the processing operation at Oakland—from the time the blend has been determined to the canning and final packing for shipment. Edward Garcia (seen in photo at right) is the supervising-office roaster.

1 **FRESH** beans are ground, then roasted and sampled for recording to determine blend. (Wide World photos)

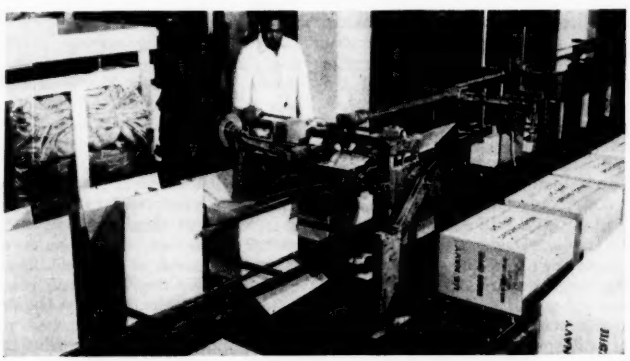
2 **BLENDED** beans, after apportioning, are chuted to mixer.



3 **ROASTING** follows the mixing, after which coffee is transferred to "car", where it is mechanically stirred to insure even cooling.



4 **PACKED** in 20-lb. tins, coffee is then vacuum-sealed (background).



5 **PACKAGING** is completed when filled tins are packed in cartons, which are machine-glued as they are conveyed to shipping room.

to make continuous processing really continuous

IT is obvious that if you want to obtain the *full* cost-cutting benefits of continuous processing, your mechanized equipment and service lines have to be kept running smoothly and with fewest possible interruptions. All unnecessary delays and shut-downs must be eliminated—and that's what Stainless Steel equipment does.

Stainless Steel cleans so easily and quickly that time-out for cleaning is reduced to a minimum. Stainless is so tough and strong, that ordinary abuse does not affect it. And because Stainless gives maximum protection against rust and corrosion and withstands wear, abrasion, heat and cold far better than other materials, work stoppages due to breakdowns and repair replacements are very few and far between.

Furthermore, because Stainless Steel is chemically inert in the presence of practically all food products and adds no metallic flavor or contamination to whatever food is in process, its use in continuous processing lines makes it possible to switch from one food to another with perfect safety and with least delay.

If you want the best results from processing equipment make sure it is made of the finest Stainless Steel—U·S·S Stainless. For here is a perfected, service-tested Stainless so uniform in composition, in finish and fabricating qualities that its use assures the utmost in equipment performance. Our engineers will gladly assist you in selecting the proper grade to assure the greatest benefits from its application.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO · CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

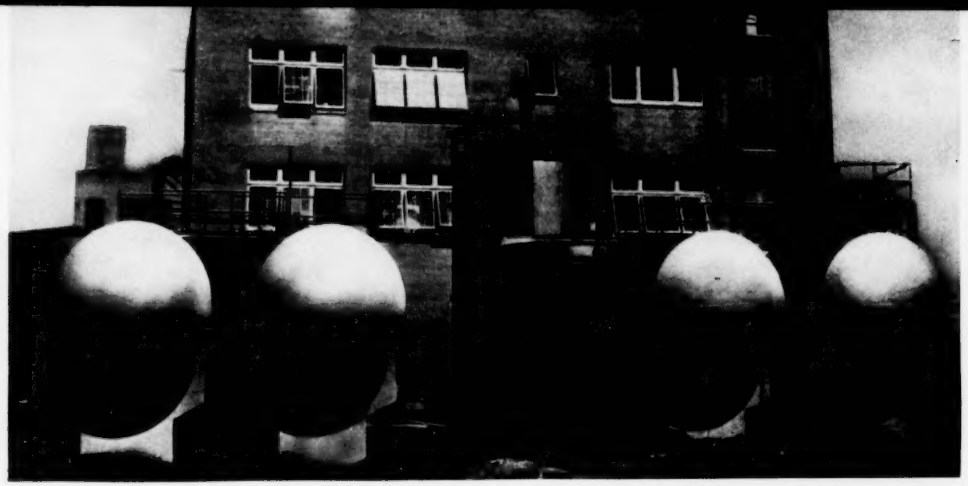
USS

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

9-788

UNITED STATES STEEL



1 TANKS for storage of hydrochloric acid and other chemicals used in the manufacture of monosodium glutamate are located in the chemical tank farm at the new $2,500,000 plant of A. E. Staley Mfg. Co., Decatur, Ill.

Glutamate Production

New Process Uses Proteins From Corn Refining Operations

(Article on Page 86)

MONOSODIUM GLUTAMATE is produced at the new plant of A. E. Staley Mfg. Co., Decatur, Ill., with a specially developed process which uses by-product proteins from the company's main operations—the manufacture of starches and sugars from corn.

Initial step in the process is filtration—depicted at (2) in fold-out flowsheet right. In this step, the protein material that comes from the company's wet-milling operations is de-watered. The material (filter cake) is then further dried to a pre-determined moisture content in a large rotary drier, and conveyed to weigh hoppers.

Here, the protein material is weighed into hydrolyzers and mixed with concentrated HCl. After digesting for 15 to 20 hr., the resulting hydrolysate is diluted with wash water from a subsequent operation, then an alkali (either NaOH or Na_2CO_3) is added to neutralize the excess HCl.

This step is followed by filtering in rubber lined filter presses. The filtrate contains glutamic acid and other amino acids. The filter cake, or humin, is thoroughly washed—with the press washes employed to dilute the hydrolysate of the following batch prior to neutralization.

Concentrated to Crystallize Chlorides

The filtrate from the above operation is concentrated to the point of incipient crystallization of the inorganic chlorides that were formed when the excess HCl was neutralized. Upon cooling, several amino acids also crystallize. These are recovered by filtration on rotary suction filters.

Filtrate from the rotary filters is now further concentrated to precipitate additional organic salts that would interfere with the subsequent crystallization of the glutamic acid. These salts are removed by additional rotary filtration. The filtrate is cooled, then HCl is added to adjust the pH to the isoelectric point of the glutamic acid—at (9) in the flowsheet. This filtrate is allowed to stand for 4 to 8 days to permit crystallization of the acid.

Separation of the crude glutamic acid is accomplished by centrifuging, followed by thorough washing. The crystals are then dissolved in water and NaOH is added to form monosodium glutamate. Activated carbon is added at this point to remove color prior to crystallization of the glutamate.

Removal of the activated carbon (by press filtering) is followed by crystallization in the glutamate crystallizer. Crystals are separated from the mother liquor by centrifuging, then dried in the small rotary drier—at (10) in flowsheet—and packaged in 1-, 10-, 50- and 100-lb. packages. To avoid contamination, drying and packaging operations are performed in a separate, sanitized, area.

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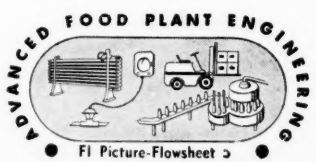
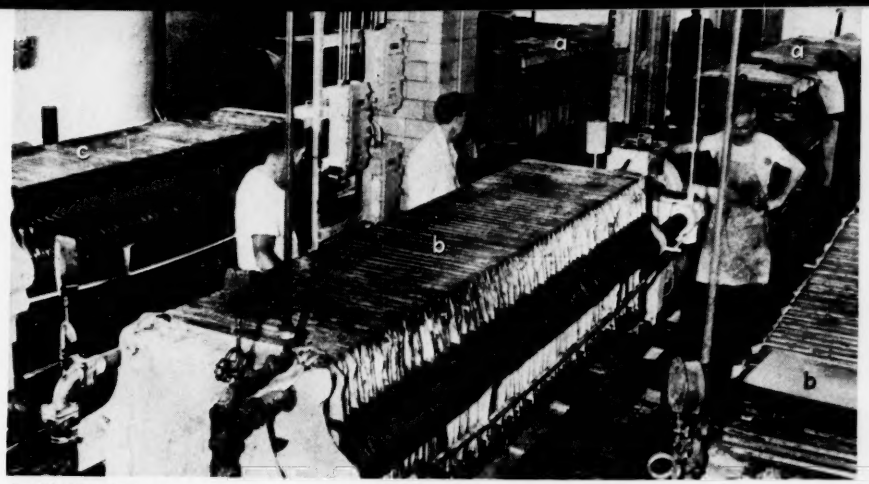
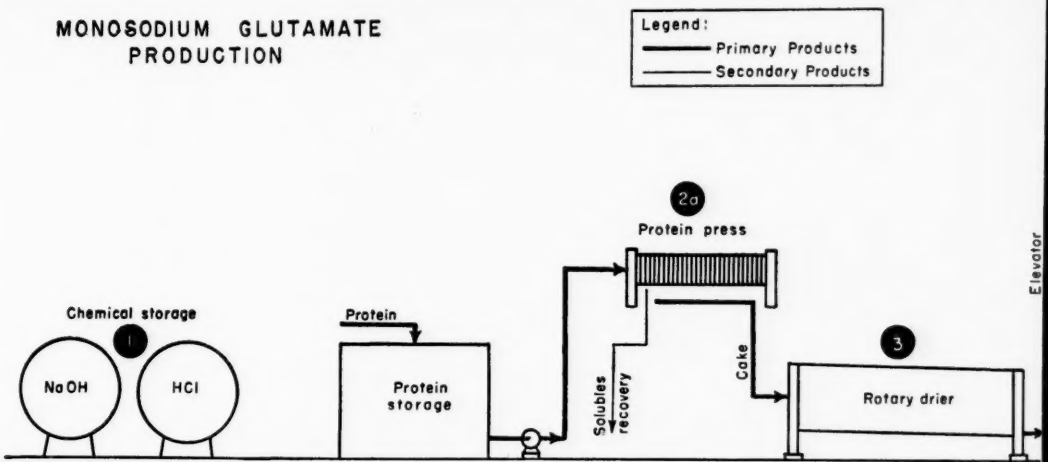




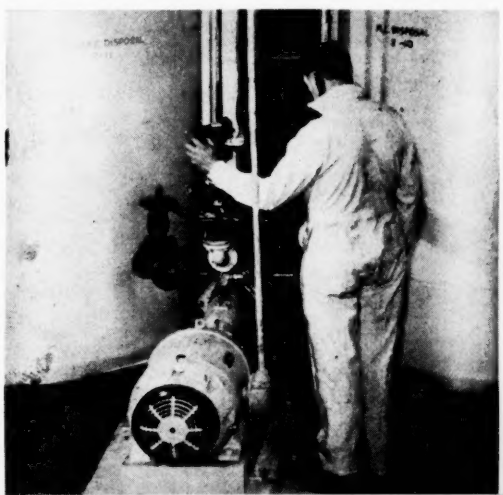
2 **FILTER PRESSES** are used at three points: (a) For separation of protein material from water before hydrolysis; (b) for filtering glutamic acid solution; and (c) for removal of carbon.

3 **HUGE ROTAR** is used to re

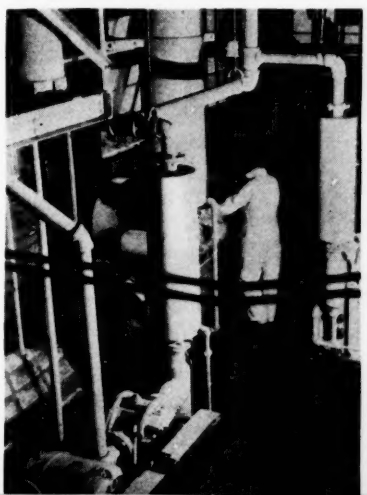
MONOSODIUM GLUTAMATE PRODUCTION



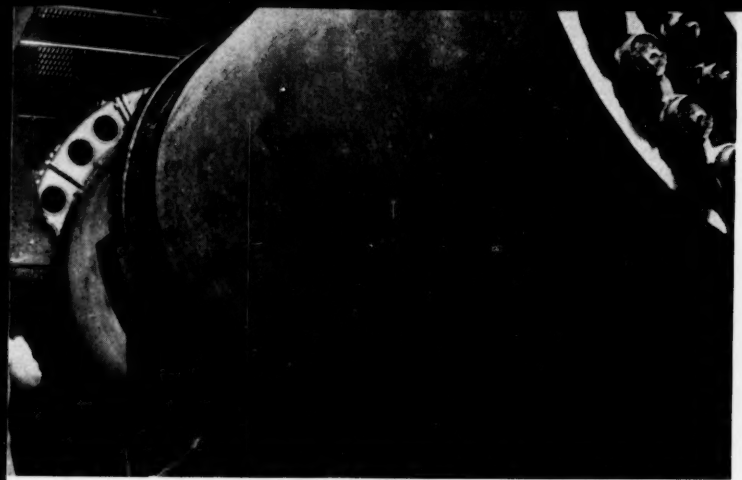
6 **CENTRIFUGAL PUMPS.** They are of special acid-resisting alloys. Stainless steel and rubber lined pipes are used.



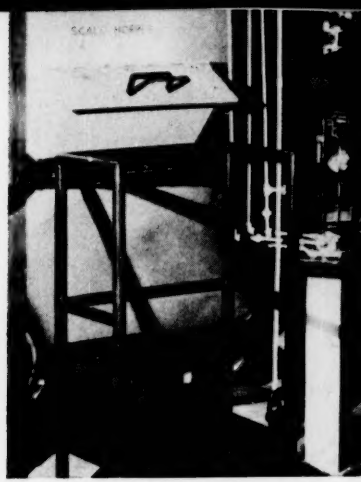
7 **VACUUM PUMPS** operate rotary filters used at several points in the operation.



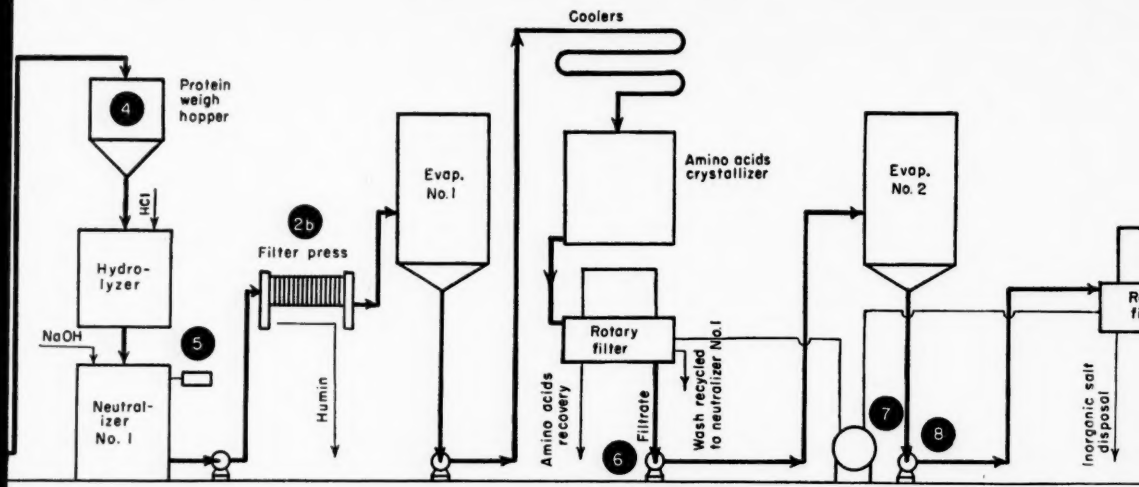
8 **STARTER** control the



Y DRIER, 45 ft. long by 6 ft. in diameter, has a capacity of 1 ton per hour. This drier ıove moisture from the raw protein material before it is started through the process.



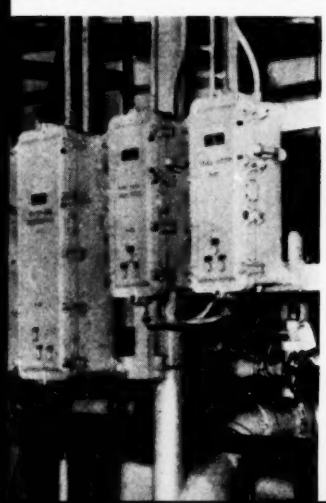
4 WEIGH HOPPER (rear), on 4th floor o measurement of raw protein material e

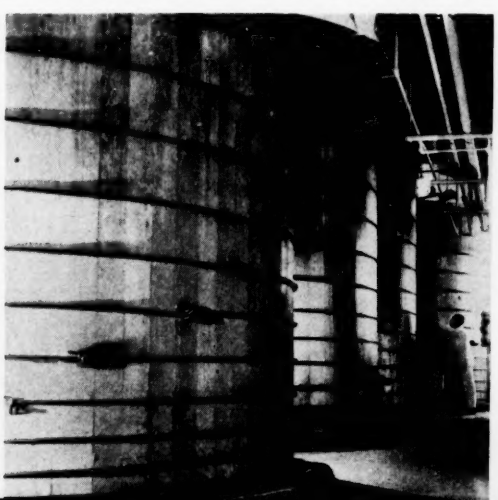


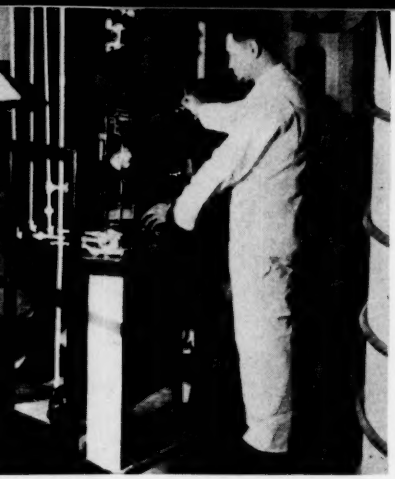
SWITCHES are explosion-proof. They many pumps used in the process.

9 LARGE WOODEN TANKS, equipped with agitators, are used to crystallize glutamic acid from the mother liquor.

10 SMALL DRIER, 1 ft. in d after final processing. Th

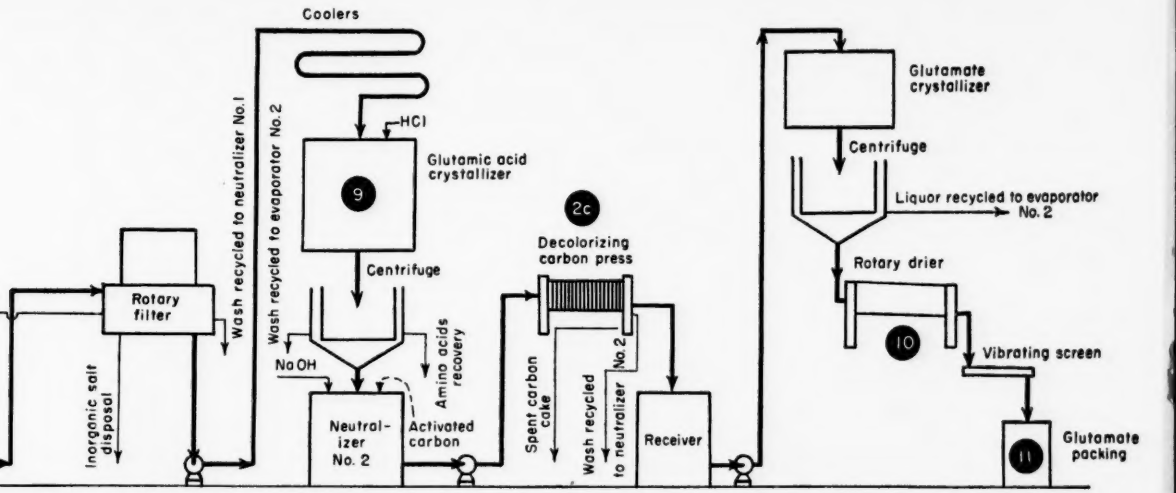






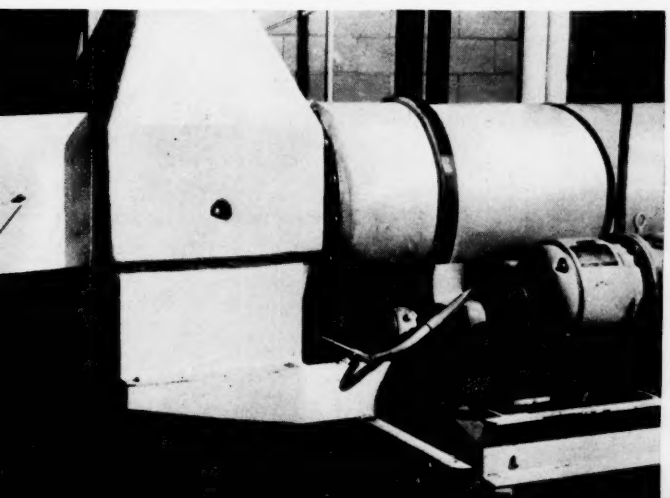
r), on 4th floor of new plant, assures accurate
rotein material entering hydrolyzers below.

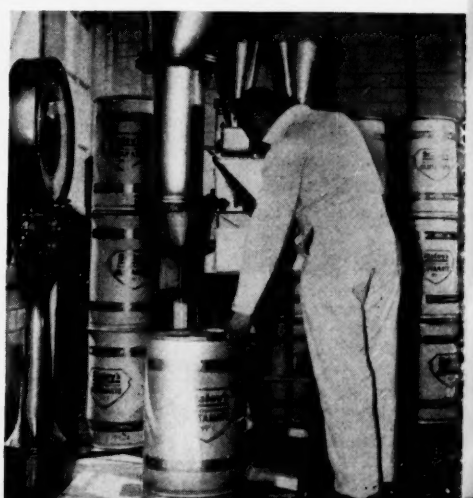
5 **pH RECORDER-CONTROLLER,** one of the many automatic instruments used in the process. This instrument adjusts acidity of liquors in glutamic acid tank.



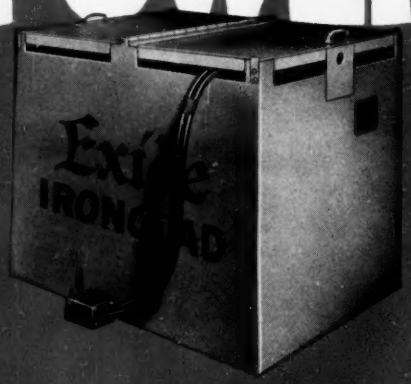
DRIER, 1 ft. in diameter by 6 ft. long, is used to dry the monosodium glutamate
al processing. The dried powder goes from here to packaging room on floor below.

11 **PACKAGING.** Dried glutamate is weighted into 100-lb. drums in a specially constructed room.





DEPENDABLE
POWER



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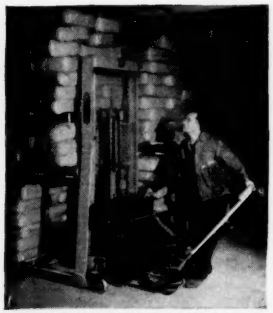

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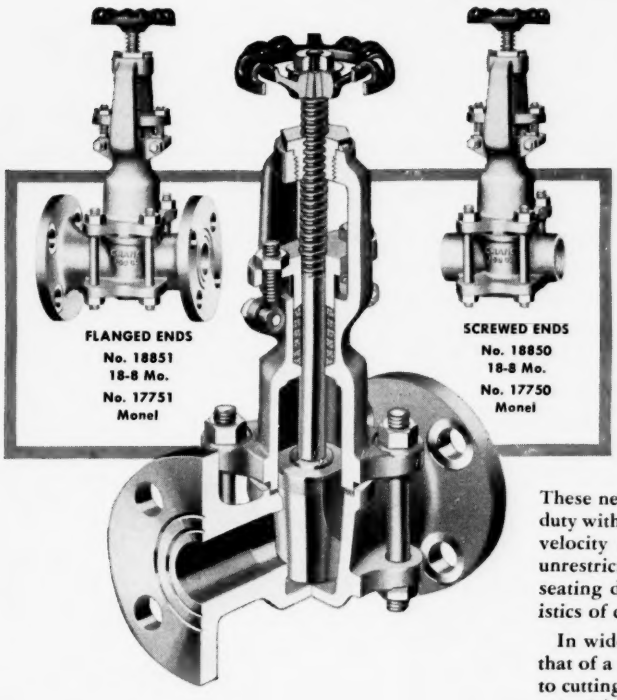

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IN 18-8 MO OR MONEL

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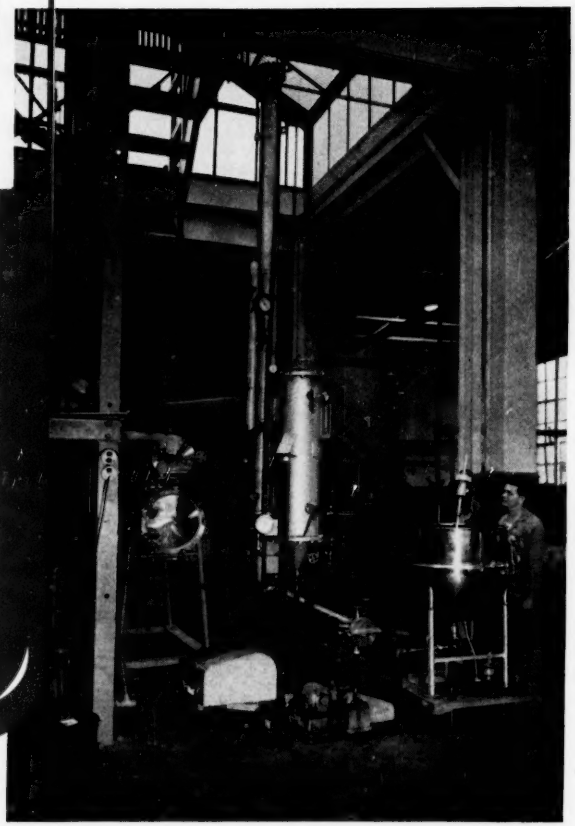

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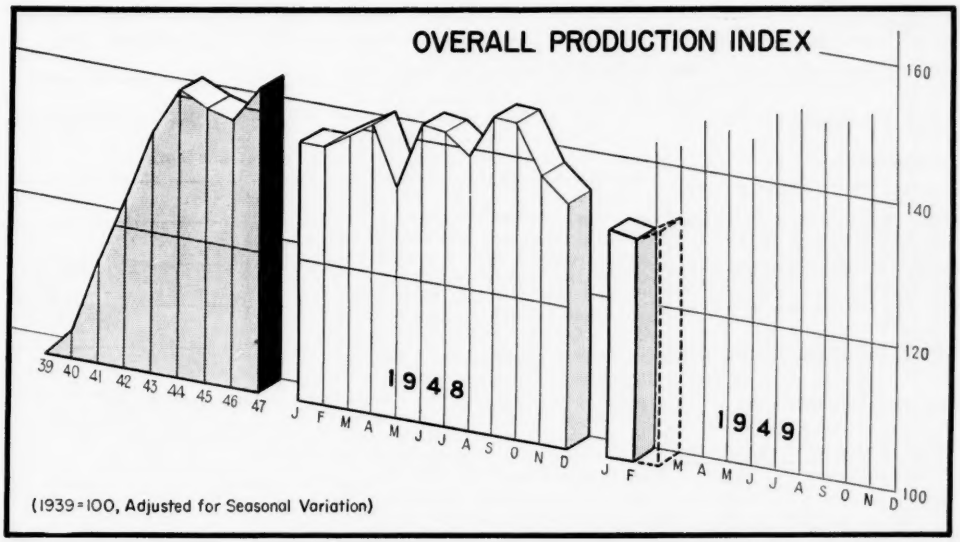
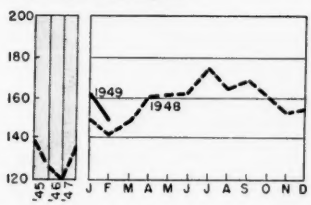
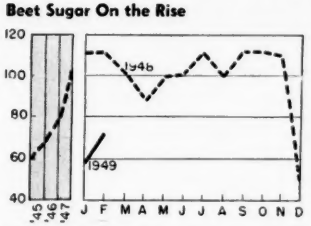

OVERALL PRODUCTION INDEX
160
140
120
100
39 40 41 42 43 44 45 46 47
1948
J F M A M J J A S O N D
1949
J F M A M J J A S O N D
(1939=100, Adjusted for Seasonal Variation)

Beverages Drop Again



Beet Sugar On the Rise



At a Glance—

(1939 = 100, With All Figures Adjusted for Seasonal Variations)

	Feb. 1949	Jan. 1949	Percent Change	Year Ago
Baking	134	131	+2	138
Beverages	149	162	−8	142
Butter	75	75	..	67
Canning	133	133	..	152
Cereals	141	136	+4	140
Condensed Milk	169	172	−2	164
Confectionery	116	120	−3	138
Flour	124	129	−4	124
Ice Cream	168	164	+2	168
Malt Liquors	142	144	−1	156
Margarine	272	284	−4	290
Meat Packing	133	136	−2	127
Sugar, Beet	71	59	+20	112
Sugar, Cane	69	71	−3	79

Mounting Processing Costs May Be Relieved By Administration's New Support Plan

A slight rise in food production is indicated for March, with the index rising from 131, the final February figure, to 133. The sharpest pick-up was shown in beet sugar output, which jumped from 59 to 71. Beverage production registered the sharpest decline of the month. From 162 to 149.

SOME of the long term production trends—and accordingly the economics of the food processor—may be greatly affected by decisions now being shaped in Washington. Congress is debating what sort of support the government shall give to farm prices after wartime price support legislation expires at the end of this year. The last Congress passed the Aiken Bill, which is now scheduled to take effect in 1950. But the Administration has asked Congress to enact a different proposal.

Both bills provide for continuing price supports in some form, so that farmers can produce large quantities of food without fear that the prices they receive will drop severely. Both bills also provide higher support prices than at present for livestock and dairy products.

But here is how the two measures differ:

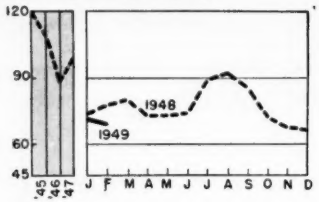
1. The Aiken Bill would provide maximum support prices around present levels, but allows for minimum support prices, which are much lower on any crop that threatens to be surplus. The Administration bill provides minimum support prices which are higher, in nearly all cases, than the Aiken maximum.

2. Under the Aiken Bill, the government would actually buy surplus commodities at the support level, and so fix the market price. The Administration bill limits such purchases to storable commodities, like wheat and corn. All other products would be allowed to sell for whatever the market offered. The government would pay the farmer a subsidy to make up the difference between support and market prices.

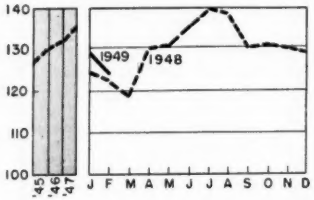
3. The Aiken Bill aims to forestall over-production by varying support prices, although there are provisions for acreage and marketing restrictions. The Administration program relies exclusively on strict controls.

For the farmers, the Administration's bill is clearly a better deal. In fact, its stated objective is to guarantee a level of farm purchasing power equal to the

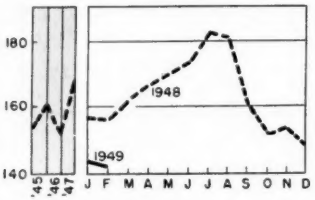
Cane Sugar Drops Slightly



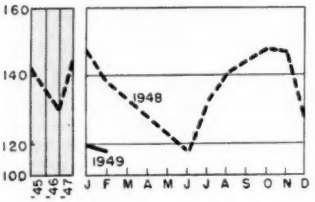
Flour Tumbles



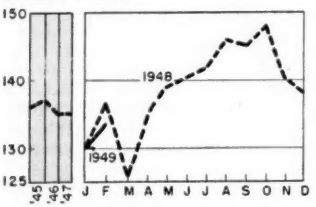
Malt Drinks Tend Downward



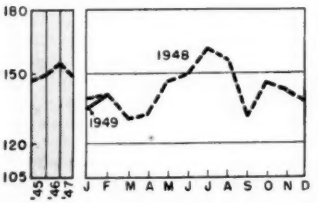
Confections Keep Falling



Baking Turns Up



Cereals Climb Back



1939-48 average. The present program and the Aiken Bill both were designed to support farm purchasing power near the 1910-14 average, which was quite a bit lower. So there will certainly be every incentive for high farm production if the new measure passes.

For some processors, the Administration program seems, at first glance, to offer great advantages. Prices of most farm products would be allowed to drop freely, instead of being supported by government buying. (Under the Aiken law, the government is committed to step in and buy hogs, milk, and other commodities, if prices skid very far next year.) This would mean much lower raw material costs, unless acreage is severely restricted.

Some sections of the food processing industry will be favored more than others if the new farm bill becomes law. Farm prices for livestock products, and hence raw material costs, could drop further under the new method of support. But the government would continue buying corn and wheat just as at present. Prices of those commodities would not decline as they could under the Aiken law. So millers would be better off under the Aiken law. Canners probably will not be affected by either measure, since support of fruit and vegetable prices is optional and seems unlikely to be tried.

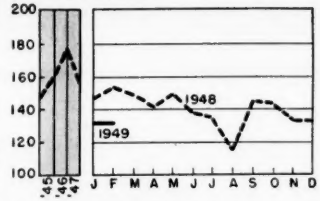
Processors could also lower prices faster, in most cases, than would be possible under the Aiken law. This, in turn, should mean greater unit sales, especially of the better quality foods. Government experts figure that by paying the farmer a subsidy and allowing food prices to drop freely they can encourage consumption of foods such as meat and milk, of which many families now do not get enough. Selling more units in this way would boost processors' profits, since the price cuts would come out of the government subsidy, not out of margins.

However, there are also unfavorable aspects to the new proposal. Most important is its potential cost. It would run to $3 billion or more in 1950, compared with less than $2 billion being spent this year. And if consumer purchasing power should drop, the Treasury might be paying out $6 to $8 billions.

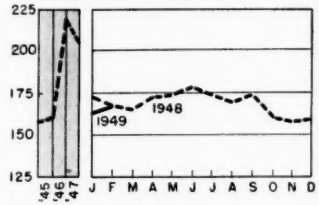
Any immediate increase in support payments is likely to come out of higher taxes on corporations, which include the food processors.

The other catch to the Truman farm program is its reliance on controls. In order to keep the cost of the program within bounds, all farmers receiving benefits would have to accept production limitations. This means a manipulated farm program, which up to now has never worked out as designed.

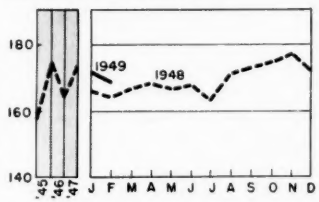
Canning Stays As Is



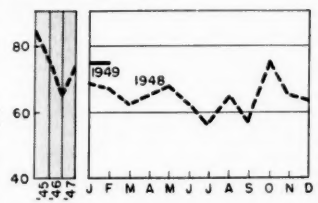
Ice Cream Up a Notch



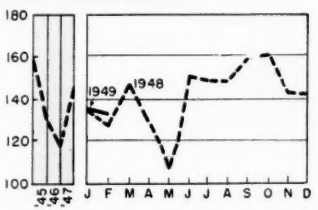
Condensed Milk Falls a Bit



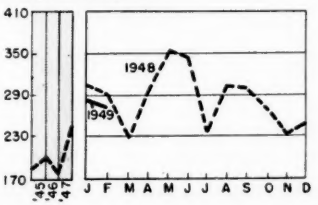
Butter Holds Level



Meat Packing Still Down



Margarine Slopes Off



TRIPLE YOUR GLUE COSTS

"Attack is the best defense"

Napoleon

From a painting by L. David. Courtesy of the Metropolitan Museum of Art.

Meet rising competition with a better quality glue that will speed up production . . . reduce assembly line rejects . . . provide better protection during shipping and rehandling . . . present a more attractive product at the final point of sale.

Remember this: Low cost producers regard glue as a service—*not a commodity*—that definitely affects production and operating costs.

Here's an actual example: A field survey shows that container flaps that become unsealed during shipping cause 30.8% of all damage considered to be under the shippers' control. Think of what this adds to operating, labor and material costs!

The answer? National's *multiple service* case sealing glue that costs three times as much as ordinary glue.

SAFE-LOK seals with a tougher, more durable bond that is unaffected by temperature and humidity variations or the shipping impacts that ordinarily cause cases to open in transit and permit pilferage, breakage and the consequent loss of customers' good will or business.

SAFE-LOK requires less compression time...bonds a wider variety of container surfaces and stocks...gives greater effective mileage...and provides the higher sealing speeds needed to handle multiple feed labeling units.

SAFE-LOK—a light colored 'RESYN'® emulsion adhesive that comes ready for use—is now being used by the most aggressively sales-minded and cost-conscious companies in the country. Address: 270 Madison Ave., NEW YORK 16; 3641 So. Washtenaw Ave., CHICAGO 32; 735 Battery St., SAN FRANCISCO 11, and other principal cities. In CANADA: Meredith, Simmons & Co., Ltd., TORONTO and MONTREAL. In ENGLAND: National Adhesives, Ltd., SLOUGH.

National ADHESIVES

EVERY TYPE OF ADHESIVE FOR EVERY INDUSTRIAL USE

New Packages and Products

Two Firms Join To Market Frozen Fowl

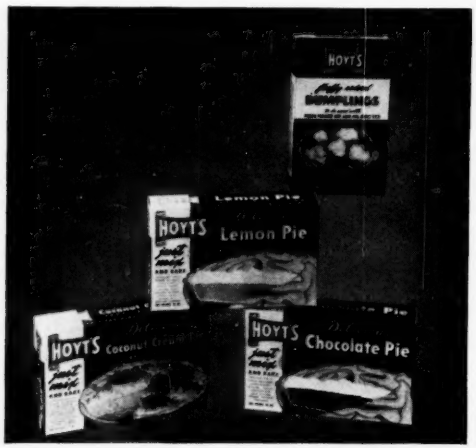
Table-dressed, quick-frozen poultry is now being boxed under a Seabrook Farms-Armour Cloverbloom label.

Arrangements for the joint venture were recently completed between the two major food firms. The meat company will procure and pack the fowl, while the marketing will be done through the Seabrook distributive facilities in the New York area.

The most attractive features of the familiar cartons of both organizations have been combined in the design of the new package. Greyish-blue is the predominating color, with bright blue bands across the front and at both ends.

The characteristic Seabrook Farms label stands out against a yellow background, and the distinctive Armour trademark is portrayed against its brown.

Through this new marketing alignment, a wider range of New York food dealers will be able to provide their customers with farm-fresh cut-up fryers and stewers, as well as whole roasters and individual parts.



Prepared Mixes for Convenient Cooking

Recent development of a novel dumpling mix and three new prepared pie mixes has been announced by Hoyt Brothers, Inc., Newark, N. J.

Following the modern trend of packaged foods, the new items stress quality of product with simplicity of preparation.

The dumpling mix is probably the first of its kind on the market. The 12-oz. box—colored red and yellow and featuring a picture of a bowl of stew with fluffy raised dumplings—holds ingredients for 18 of the delicacies. Directions simply call for the addition of a small amount of water to make a thick batter, which is dropped by the spoonful onto the cooked stew or fricassee, to simmer for 17–20 minutes.

Also offered by the company are lemon, chocolate, and coconut cream pie mixes—in 14-oz. red, white and blue boxes, which feature realistic illustrations of the finished products. Each carton contains two sealed bags, one for the crust and the other for the filling.

These products are being introduced in chain and independent grocery stores throughout the East and in the Chicago market.

Cookies Offered in Useful "Scotch" Package

White glassined wax-paper bags, attractively printed in red and black, are being used by Arnold Bakers, Inc. of Port Chester, N. Y., to introduce its new Oatmeal Cookies. The company's well-known little baker-man, "Bob", appears in kilts on the package, (see photo above), and the whole motif is Scotch.

No artificial flavorings are used in the cookies. Ingredients include: Wheat flour, sugar, oatmeal, raisins, shortening, butter, eggs, salt, leavening, skim milk solids, pure vanilla extract and spices.

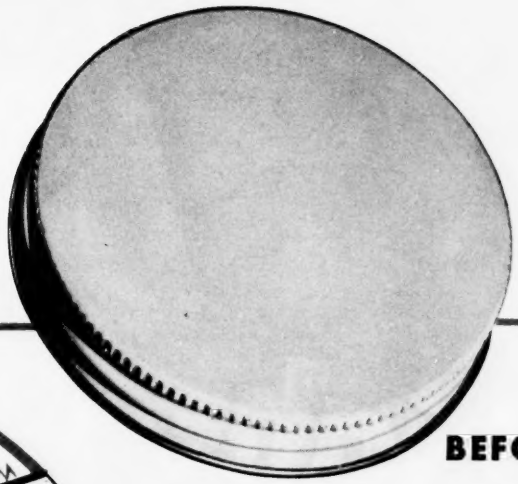
The product has been market-tested in Massachusetts, central New York state, and southern New Jersey. Full distribution of the cookies in 14 states is expected shortly.

When the package is empty, it can easily be used for such purposes as a lunch container for school children, a fruit carrier on picnics, and the like.

The bag has a net weight of 8½ oz. and holds twelve large, brown cookies. The company reports that months of research and experimentation preceded development of this product—to meet the highest standards comparable with home-baked cookies.

(Packages and Products Cont'd)

WHICH CAP WILL STOP SHOPPERS?



BEFORE

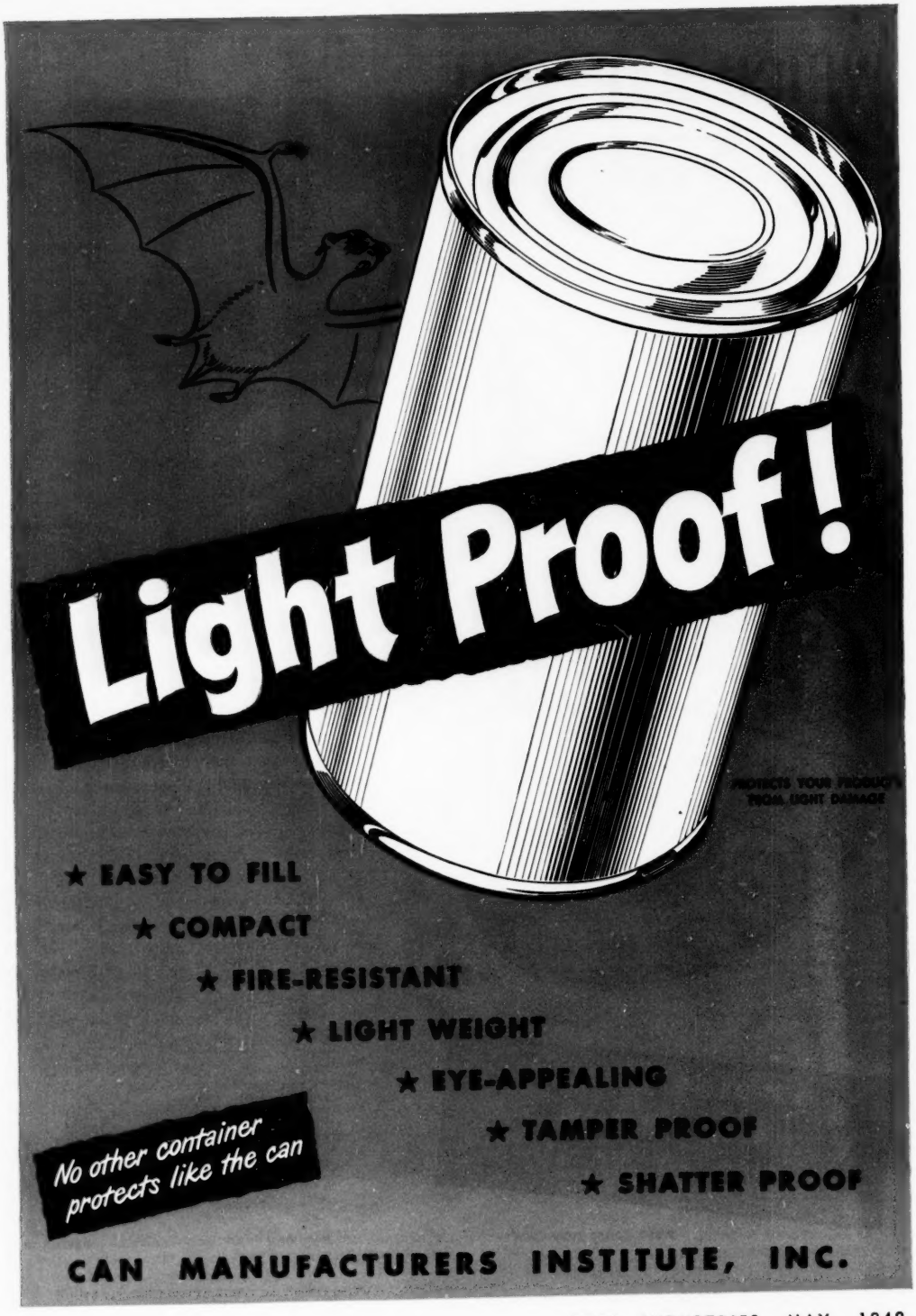
AFTER

THE CAP THAT SELLS is the cap with the colorful design. Time and time again, good packaging has proved to be the effective selling tool in moving goods off store shelves. This "before and after" illustration shows you how Armstrong's expert package designers make a plain cap into an effective colorful shopper-stopper. Our designers will be glad to show you how a crisp, sparkling sales message on your metal cap will enhance the appearance of your package and sell more goods. For just a fraction of a cent per cap, the message can be added in color. For suggestions, send sample package and complete market data to Armstrong Cork Company, Glass and Closure Division, 4205 Prince Street, Lancaster, Pennsylvania.

Armstrong's Closures

TURN STANDARD CONTAINERS INTO STANDOUT PACKAGES

WEST COAST REPRESENTATIVE: I. F. SCHNIER CO., INC., SAN FRANCISCO 7 AND LOS ANGELES 12


Light Proof!
PROTECTS YOUR PRODUCT'S TRUE LIGHT DAMAGE
★ EASY TO FILL
★ COMPACT
★ FIRE-RESISTANT
★ LIGHT WEIGHT
★ EYE-APPEALING
★ TAMPER PROOF
★ SHATTER PROOF
No other container protects like the can
CAN MANUFACTURERS INSTITUTE, INC.

"Pantry Shelf" Meals

Latest canned products to be developed by Armour and Company, Chicago, are pork sausage, spaghetti with meat, beef stew, and chop suey (vegetables with meat).

Twelve ounces of pork sausage, composed of pure pork in natural juices, is packed in a lithographed luncheon-meat can. Contents are ready to be sliced, heated and eaten.

The other products are packed in circular cans with paper wrap-around labels. The company calls them "pantry shelf" meals. They need only a few minutes of heating before serving.

Cans are all in the customary red and white colors and have the famous Armour star label.

Aunt Jemima's Doin' It, Too

Ready-mixes for devil's food and silver cakes have just been introduced by The Quaker Oats Co., Chicago.

The Aunt Jemima trade mark, which has become a standard in pancake mixes, appears on these two new preparations.

Both products are offered in 1-lb. packages brightly printed in red, white and blue. An illustration of a tasty-looking piece of baked cake, and naturally, the traditional mammy, appear on the front of each box, while the back carries easy directions for producing the cake. Nothing need be added to the mix except a cup of water.

Having been market-tested for about one year in the Boston, Syracuse, and Philadelphia areas, the mixes are now being offered on a nationwide scale.

Butter Mints Stay Fresher

Greater freshness retention in the company's butter mints has been assured Vernell's, of Seattle, by recent adoption of a new Trietect (Pliofilm) package. In fact, says the manufacturer, the shelf-life is now four months, compared to two months in the plastic-type bag formerly used.

The new 7-oz. container, with a window panel, bears a rotogravured label in green, silver, and white. The bags are packed one dozen to a display carton and two cartons to a case. Close packing enables shipment to California and some midwestern states.

The mints are made from 93-score butter, sugar, corn sirup, yeast, salt, oil of peppermint and vanilla.

French Fried Onion Mix

As a time and money saver for restaurants, french fried onion mix is now being offered by Modern Maid Food Products of Brooklyn, N. Y.

No milk or eggs are needed in preparation. The cook need only dip the onions into the mixture, roll in Redi Breader (another of the firm's products), then fry, says the manufacturer.

(Packages and Products Cont'd)

Why risk uncooked Food?

Use ATI COOK-CHEX

BATCH No.
RETORT No.
ATI COOK-CHEX

No Error!

Simply place an ATI Cook-Chex retort tag on each basket before cooking. When tag turns green, you *know* the food is fully cooked.

No Worry!

ATI Cook-Chex retort tags are unfailingly accurate. They guarantee you against human error. They safeguard consumer good-will and company profits.

No Loss!

ATI Cook-Chex prevent waste or spoilage, and they cost so little. Less than 1/50¢ per case.

THESE LEADING RETORT CANNERS USE ATI COOK-CHEX:

Burnham & Morrill Co.
California Packing Corp.
College Inn Food Products Co.
The Columbia Conserve Co.
Concord Foods, Inc.
Elkhorn Canning Co.
D. E. Foote & Co.
Gerber's Baby Foods
Gorton-Pew Fisheries Co., Ltd.
Grocery Store Products Co.
Hunt Foods, Inc.
Illinois Canning Co.
LaChoy Food Products
S. E. Mighton Co.
Matmor Canning Co.
Nu-Trishus Products Corp.
Riviera Packing Co.
Sun Harbor Packing Co.
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LOS ANGELES 16, CALIF.

Awarded by The Franklin Institute for Discovery, Invention, or Development in Physical Science

RESEARCH REPORT

NUMBER TWO

ON THE PROGRESS OF MAKING DRY SEPARATIONS BY SPECIFIC GRAVITY THROUGH AIR-FLOTATION

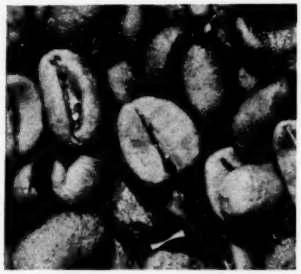
COMPILED FROM SIXTY-ONE YEARS OF SPECIALIZED EXPERIENCE IN SEPARATIONS

Problem: *Grading Coffee Beans*

Solution: *S S & S Process*

The following unretouched photographs illustrate graphically the efficiency with which a Model BX-100 Specific Gravity Separator was used to effect *a general grading by differences in the apparent bulk density of the various components.*

While this particular application of Sutton, Steele, and Steele separating equipment is standard plant procedure among coffee wholesalers and processors, it serves to emphasize how hundreds of other types of dry agricultural and industrial products can be salvaged from contaminations and unuseable materials, and up-graded to premium quality products.



***PRODUCT No. 1,** the heaviest material (lbs. per cubic foot), consisted of top-grade coffee beans and represented 22.2% of the total volume. Note the consistency in general appearance of each individual bean.*

***PRODUCT No. 3*,** consisting of lower grade beans of medium weight, is an arbitrary gradation made to control the quality of Product No. 1. After Product No. 1 has been salvaged, Products No. 2, No. 3, and No. 4 can then be re-graded in the identical manner.*

***PRODUCT No. 5,** containing hulls and broken beans, was removed at the lower, or "lighter," end of the deck and represented 7.5% of the total volume. Check YOUR separating problem today. Chances are, the S S & S Process is your answer, too.*

*Products No. 2 and No. 4, also of middle grades, have not been shown due to space restriction.

LITERATURE AVAILABLE

Tell us about your separating problem and we will forward bulletins which describe in detail how the famous S S & S Process can be applied successfully to your particular needs. Address inquiries to:

DEPARTMENT A

SUTTON, STEELE & STEELE, INC.
1031 SOUTH HASKELL AVENUE
DALLAS, TEXAS, U. S. A.

SUTTON, STEELE & STEELE, INC.

Dallas, Chicago, Des Moines, Minneapolis, New York City, Pittsburgh, San Francisco, Columbus, Ga., Jackson, Mich.
Foreign: Winnipeg, Canada; San Paulo, Brazil; London, England.

Sundae On a Stick

The banana split, teen-ager's delight, has now been assembled in all its luscious goodness and placed on a stick.

Newly marketed under the Eskimo trade name by Golden State Co., Ltd., San Francisco, Calif., the Banana Split on a stick contains puree of fresh bananas mixed with 12 percent butterfat vanilla ice cream, chopped maraschino cherries and nuts, all dipped in a high-quality chocolate flavored coating. The red and cream colored package is marked with a lively personified banana figure.

Golden State, which has the exclusive franchise for Eskimo products in California, also originated the Eskimo Coconut Bar.

This Time It's Nesselrode

Another pie mix, Nesselrode Cream Pie, has recently been introduced by Betty Gaylord Food Products, Inc., of Glendale, L. I., New York.

The pasteboard box, colored blue, gold, and red, holds two separate bags. One contains the piecrust and the other the nesselrode filling.

Ingredients are: Flour, shortening, baking powder, corn starch, powdered whole milk, powdered skim milk, wheat starch, tapioca starch, sugar, powdered egg yolk, butter, salt, artificial rum flavor and U. S. certified color.

Distribution is presently limited to the New York metropolitan market.

(Packages and Products Cont'd)

(A Quick Quiz on modern pH advancements)

Do you know these important facts about BECKMAN pH CONTROL?

Do you know...

That Beckman pioneered modern glass electrode pH equipment?

Until Beckman pH instruments were developed, glass electrode pH equipment was a cumbersome, complicated laboratory curiosity. It was Beckman that pioneered today's simple, compact, highly accurate and completely dependable glass electrode pH equipment!

That Beckman pioneered virtually every major development in modern glass electrode pH equipment?

Such far-reaching advancements as the High pH Glass Electrode . . . the High Temperature Glass Electrode . . . the Unusually Rugged "X-9" Glass Electrode . . . as well as a wide range of other vitally important advancements in glass electrode pH instrumentation, were *all* pioneered by Beckman. ***Many of these advancements are still available exclusively in Beckman equipment!***

That Beckman offers the industry's most complete line of glass electrode pH instruments?

Included in the complete Beckman line are instruments specially designed to combine the high precision and wide versatility necessary for advanced research, medical and laboratory applications . . . others that combine maximum simplicity and high accuracy with complete portability for plant and field applications . . . still others that combine maximum simplicity and high accuracy with the plug-in convenience of full AC operation . . . plus *completely automatic* pH equipment for continuous pH indication, recording and control on large-scale processing applications.

That Beckman also provides the industry's most complete line of modern glass electrodes?

Although glass electrode pH instruments are the most efficient pH equipment obtainable, no glass electrode pH instrument is better than the versatility, accuracy and dependability of the electrode assemblies available for use with it.

Beckman provides the industry's most complete line of glass electrodes for use with Beckman pH instruments—a type of electrode assembly to meet every industrial, research, laboratory and field requirement!

That there are so many money-saving applications for Beckman pH control that you may be losing important profits unless you make a complete investigation of your operations?

There is pH wherever there's water, water solutions, moist pastes, sludges, slurries or other moisture-containing substances. And wherever there is pH, chances are the operation can be done better . . . with greater uniformity and less waste at lower overall cost . . . by Beckman-controlling the pH of the various processing operations.

WHETHER you manufacture food products or treat sewage . . . do metal plating or refine crude oil . . . make textiles or process ore — in fact, no matter WHAT *your field of operation . . . if you have not yet determined whether Beckman pH Control can be used to advantage in your operations — possibly is already* BEING *used to cut costs by your competitors — let us study your processes and make helpful recommendations. No obligation, of course.* BECKMAN INSTRUMENTS, NATIONAL TECHNICAL LABORATORIES, SOUTH PASADENA, 18, CALIFORNIA.

BECKMAN

For an informative, non-technical outline of modern pH control — what it is and how it's used — send for this free booklet "What Every Executive Should Know About pH."

INSTRUMENTS CONTROL MODERN INDUSTRIES

pH Meters and Electrodes — Spectrophotometers — Radiation Meters — Special Analytical Instruments

"PACKAGE" WRAPPING MACHINES

"PACKAGE" machines are the fastest machines of their kind. They pare production costs by saving time, labor, and floor space. And the uniformly attractive wraps they turn out have been helping to keep some of industry's biggest names in the sales spotlight for years.

Over 80 Standard Models

There's a "PACKAGE" machine to meet the wrapping needs of virtually every manufacturer.

Most models are quickly adjustable for numerous package sizes, and are adaptable to practically any plain or printed wrapping material. The majority require but one operator. And all operate smoothly with a minimum of maintenance.

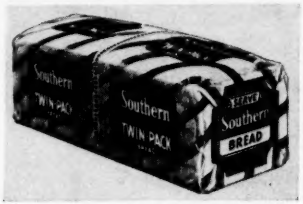
We'll be glad to send you a copy of "Packages that Sell"—an illustrated leaflet showing many different types of packages and describing our machines in greater detail. Write for it today.

America's leading manufacturers consistently choose "PACKAGE" machines

PACKAGE MACHINERY COMPANY

SPRINGFIELD 7, MASSACHUSETTS

NEW YORK CHICAGO BOSTON CLEVELAND
ATLANTA DENVER LOS ANGELES SAN FRANCISCO
SEATTLE TORONTO MEXICO D.F.



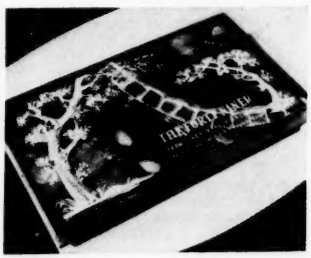
Anniversary Restyling

Along with celebrating its 25th anniversary, the Columbia Baking Co. of Atlanta, Ga., has revised its bread wrappers to give a strong family appearance to all of its Southern Bread loaves.

During the firm's growth, as the demand arose, a number of different loaves were put on the market. Since the packages were not coordinated, the various wrappers bore little resemblance.

Now, in conjunction with the Rapinwax Paper Co. of Chicago, the company has reappraised the packaging designs and has developed a uniform package for greater emphasis on point-of-sale display.

The new wrapper comes in three different types of paper—Waxlite, Rapinglas, and white opaque—all with striking diagonal stripes. A large decal bearing the Southern trademark is placed at each end of the loaf.



Impulse-Buying Visibility

Luscious fruit with a sales-luring look has been attractively boxed with a crystal clear hood of Lumarith (a Celanese Corp. cellulose acetate plastic) by the Vaca Valley Orchards of California.

Called the Forty Niner, the box contains an arrangement of fruit and fruit candy. Full advantage is given to the natural appearance of the contents by the transparency of the wrap.

Fleischacker Paper Box Co., San Francisco, supplies the package and silk screens a white design and brand identification on the plastic top.

—End

Even "PROBLEM" Surfaces

covered in one coat by

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GROWERS • PACKERS • SHIPPERS
California Green and Dried Fruits - Vegetables
FROZEN Fruits - Vegetables - Berries
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We are so pleased with your Spray-Day-Lite that we want you to know how satisfactory it has proven to be.

We applied one coat of Spray-Day-Lite to the rough, unpainted wooden ceiling and the concrete walls of our processing plant six months ago. Today the surface is as smooth as it was when applied and the same non-glare, clean and sanitary appearance still prevails.

We would be pleased to recommend Spray-Day-Lite as an economical and highly satisfactory paint for food plant interiors.

Very truly yours,
A. L. Ruso & Co.
A. L. Ruso
President

. . . . and Glidden COLOR SERVICE

gives you all these extra dividends at no extra cost!

America's first and finest Color Service—*free* when you use Glidden quality paints—will help you to employ colors scientifically to secure many extra dividends from your painting. With Sight Perfection color prescriptions tailor-made for your buildings by Glidden color experts, you can improve seeing conditions, reduce lighting costs, promote safety, build morale. Send coupon below today for all the details.

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- ☐ Please send literature to indicate the thorough nature of your *free* Sight Perfection Color Service.
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- ☐ You may have your representative call to demonstrate SPRAY-DAY-LITE without obligation on our part.

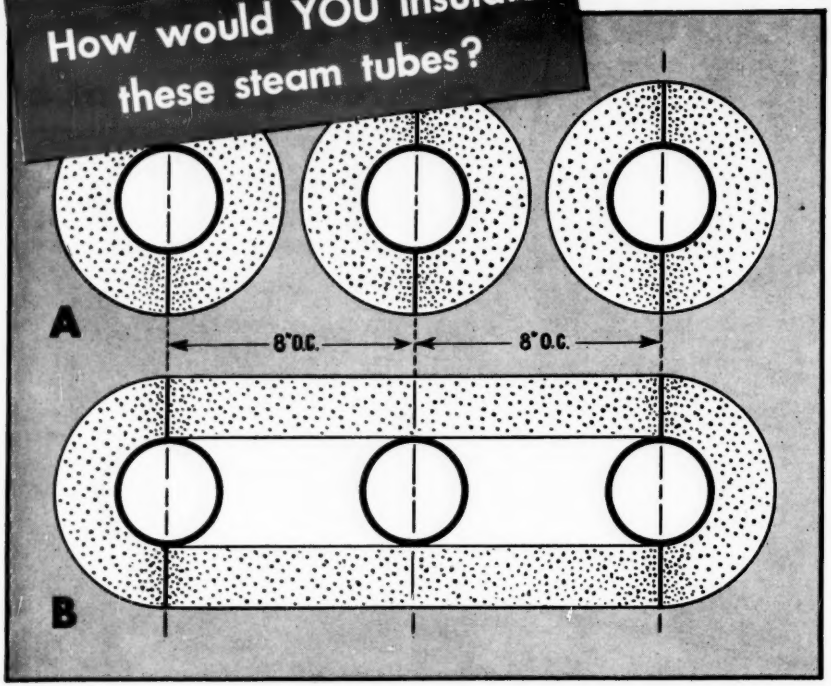
NAME_____

COMPANY_____ TITLE_____

ADDRESS_____

CITY, ZONE, STATE_____

How would YOU insulate these steam tubes?



These 3½" downtake tubes connecting the lower drum with the bottom waterwall headers operate at 375° F. Specifications call for 2" of 85% Magnesia insulation with sewed canvas finish. Would you insulate each pipe individually, as shown at A, or would you box them in with half sections of pipe covering on the ends, and block insulation between, as shown at B?

HERE'S WHAT THE ARMSTRONG ENGINEER RECOMMENDED:

In this case the Armstrong Engineer recommended Method B. His calculations showed that from a material and labor cost standpoint it would be less expensive to insulate the three tubes as one unit. Method B also cuts down the amount of insulation surface from which heat is lost by radiation. As there is practically no maintenance on tubes of this kind, the fact that Method A allows for easier access for repair work did not have to be considered.

Had the tubes been spaced several inches farther apart, or if maintenance had been a problem, then Method A would have been the most practical to use.

Often, the dividing line between two methods of solving a certain insulation problem is pretty finely drawn. When these cases present themselves, Armstrong engineers take pride in their ability to arrive at a specification which will provide the best job. If you consult the Armstrong Office nearest you before planning your next insulation job, they will be glad to offer you their thinking on any problems you may have. Their solutions can often save you time and money.

FREE BOOKLET

Write today for your free copy of the 28-page booklet, "Armstrong's Industrial Insulations." This booklet contains specifications for application of both heat and low-temperature insulations and an insulation chart listing types and thicknesses of insulation for all temperatures. Write to Armstrong Cork Company, Industrial Insulation Dept., 4205 Maple Ave., Lancaster, Pennsylvania.

ARMSTRONG'S INDUSTRIAL INSULATION

Complete Contract Service For All Temperatures

From 300° Below Zero

To 2800° Fahrenheit

Food Industry News

Grade Standards for Frozen Orange Juice Are Being Prepared by USDA

The Department of Agriculture is getting ready to issue voluntary grade standards for the frozen concentrated orange juice. And—more important—it is also working on plans that would make it mandatory for all packers of the fast-growing food product to adhere to quality standards.

The Department's authority to regulate frozen concentrate processors stems from the fact that the Secretary of Agriculture holds a patent pertaining to the process, which was developed through cooperative research at the Department's citrus laboratory in Florida.

While no decision has been made as yet, Department officials are studying the possibility of licensing the use of the patent only to processors who adhere to the voluntary standards set up by the standards division of the Production & Marketing Administration's fruit and vegetable branch.

Packers Want Quality

What many established packers fear is repetition of the experience the entire frozen food industry went through just after the war's end. At that time, many newcomers leaped into the frozen food business. Quality standards went down, and the housewife reacted against frozen foods generally. The net result was that many of these new companies were squeezed out of the business, and packers of quality frozen foods—financed for the long pull—brought frozen foods back in the housewife's estimation.

The Department isn't likely to move quickly in trying to police the frozen concentrate packers. For one thing, when it does make a move, it will be the Department's first action of this kind in the food field. In setting up regulations in its licensing agreements, the Department has to consider just how it would police them, and how far it could go. Enforcement of such a licensing agreement is a problem that will have to be handled with extreme delicacy, for it could backfire by stimulating charges of persecution and over-reaching of the Department's authority.

Actually, the Department has several hundred patents, but only a handful of them involve licensing agreements that are more than a mere formality. The arrangement that perhaps comes closest to the frozen concentrate situation is the one by which the Department licenses manufacturers who use its patents on insecticides in aerosol bombs. The Department requires, in its license, that the licensors submit samples at regular intervals, and inspection reports. This is to insure standards of purity, and to guard against toxicity.

Requiring quality standards on a food product, however, as a condition of getting a license to use the frozen concentrated orange juice process is quite a different thing.

The battle over standards has already begun with the publication in the *Federal Register*, on March 1, of voluntary standards for grades of frozen concentrated orange juice.

As proposed, the standards do not provide for a concentrate with sugar added, which some processors would like to have included. They provide for three grades (A, B, and D, or substandard), with no mention of optional ingredients to be added to the pure orange juice concentrate.

The problem in providing for the addition of sugar to the concentrate is this: Addition of sugar reduces the amount of orange juice that goes into the consumer-size can. Department officials say that it takes only three boxes of oranges, with sugar added, to produce the same quantity of juice as four boxes of oranges without sugar. The question then arises, whether there is any deception to the housewife. The sugar-added product, they point out, actually contains about one-fourth sugar (by volume).

Furthermore, sugar is much cheaper than orange concentrate, so there is a potential question of dilution or adulteration in the use of sugar. It would be possible, for instance, for a processor by using sugar in the concentrate to (a) undercut the price of concentrate without sugar or (b) charge the same price, and thus reap a considerable cost-saving.

Canned Pea Association Plans Promotion

The Canned Pea Association recently announced that sufficient members have subscribed to the Association to assure its continuance. The objective of the group is to extend assistance to distributors in the merchandising of canned peas through advertising, publicity, public relations, and point-of-sale aids.

Can Manufacturers' Institute is cooperating in the program. It will conduct publicity and public relations for canned peas which will be intensified to campaign proportions in October to support distribution of the 1949 pack.

This year, in addition to special promotional effort, the activities of the Association will be directed toward further cementing relationships with distributors for close cooperation to increase distribution of canned peas.

(Industry News Continued)

Talk Over Heinz Quality

Members of the H. J. Heinz Co.'s research and quality control staff recently put in a two week "school" session on methods, at the company's Pittsburgh plant. Seen here, from left: J. Hudnut, Pittsburgh plant; E. N. Higgins, Tracy, Calif., plant; H. Bendle, Muscatine, Ia.; F. K. Whitfield, Chambersburg, Pa., factory; and C. L. Rumberger, research and quality control manager.

Congress Slates Food Laws Despite the Slowdown

Much legislation of importance to the food processing industry is going to be passed by this year's session of Congress, despite the present apparent slowdown.

With Congress behind schedule the belief is growing that the legislators may recess about July—but come back in the fall to wind up unfinished business.

Taking this possibility into consideration, here is a size-up of the prospects for legislation at this time:

Basing point: One-year moratorium bill likely to be approved. This would declare that it is the intent of Congress to permit, in the absence of a conspiracy, manufacturers to absorb freight or quote delivered prices to meet competition without being liable to charges by Federal Trade Commission.

Science Foundation: Bill meeting President's objections to previous proposals is certain to pass. It will provide for director of the foundation to be appointed by the President; the director will be the chief executive officer of the foundation.

Taft-Hartley: The President will get a new labor law, but it will include more of Taft-Hartley than he would like.

Minimum wage: This is not scheduled for debate until after Taft-Hartley. The law will bring the minimum up to 65 cents, perhaps 75 cents per hour. Present bill calls for expanding coverage of agricultural processors, but if going gets rough in Congress, the expansion may be cut out, leaving the coverage about what it is now.

Price supports: Anybody's guess (see story page 145).

Taxes: Congress is torn between effect of higher taxes on deflation trend and a fear of deficit financing. Showdown not likely until mid-summer, perhaps this fall.

Social Security: Payroll tax will be increased to 1½ percent on employer and 1½ percent on employee; coverage may be broadened.

Price, wage controls: Not a ghost of a chance.

Materials allocation: Chances are still good for continuation of present voluntary program, now due to end in September. But prospects for new mandatory allocation powers are getting slimmer every day.

Oleomargarine taxes: May be holed up in Senate (see story page 148).

Food Company Earnings

Sales and earnings showed increases in 1948, in three recently issued food company statements. In three others earnings dipped slightly, while two of the corn products manufacturers revealed sharp drops in earnings.

National Dairy Products Corp. had a sales volume of $986,403,723 for 1948, compared with $897,323,456 the year before. Net earnings were $25,358,546, and $23,159,391, respectively.

Sunshine Biscuits, Inc., increased sales to $109,122,549 in 1948, from the 1947 figure of $100,157,790. Earnings rose to $6,923,284 from $6,147,211.

General Foods Corp. recorded the highest net sales as well as the largest earnings in the company's history. Sales reached $463,336,031, in 1948, and net earnings were $24,555,752. This compares with 1947 sales of $407,266,910, and earnings of $18,303,594. It was the 15th consecutive year in which net sales were higher than any previous year. Earnings per dollar of sales have declined, however. In 1939 earnings were 11c. on the dollar, while in 1948 they dropped to 5c., only a ½c. higher than the historical low of 4½c., earned in 1947.

Standard Brands, Inc., and subsidiaries operating in the U. S., showed increased net sales, in 1948, but reported a slight drop in earnings. Sales were $283,616,094, compared with $276,131,392 in the previous year. Net earnings came to $7,277,727, in 1948, as against $8,119,349.

National Biscuit Co. increased 1948 sales to $296,250,431, from the $263,893,660 reported in 1947. Net income was $22,713,736, a slight dip from 1947's net of $22,902,126.

The Borden Co's. net sales were highest in history, but earnings dropped to the lowest since the war. Their 1948 sales totaled $649,592,375, almost 8 percent over 1947's $602,959,406. Earnings, on the other hand, declined to $19,179,427 from the 1947 figure of $19,793,276.

A. E. Staley Mfg. Co. saw 1948 sales increase while profits took a sharp drop. Net sales totaled $147,455,148, as against $146,353,726, in 1947, and $99,762,966, in 1946. Net earnings in 1948, were $6,622,601, in 1947, $11,991,266, and in 1946, $7,660,559.

Corn Products Refining Co., in 1948, dropped below the previous year in both sales and earnings. Net sales were $188,444,774, compared with the 1947 total of $212,919,754. Net income was $12,870,322, in 1948, and $17,037,979, in 1947.

Associated Press

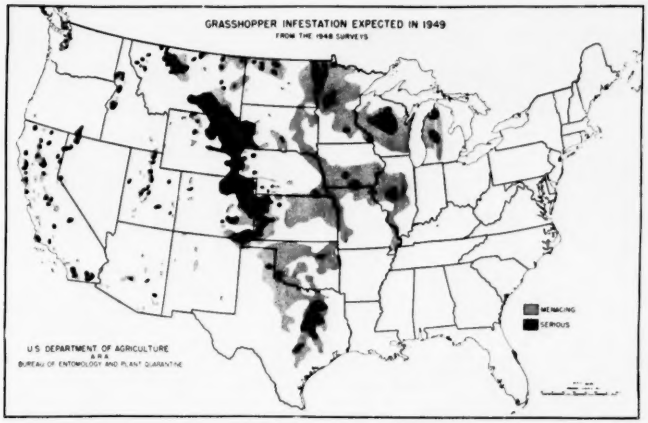
Berlin's Floating Warehouses

These German barges in the Main River, at Frankfurt, serve as warehouses for food that will go to blockaded Berlin by airlift. About 18,000 tons of food are stocked aboard the boats. The food is imported from the U. S., Italy and Hungary. Warehouse capacity can easily be increased or decreased by adding or removing barges.

To Replace Soybean Plant At A. E. Staley Co.

A. E. Staley Mfg. Co., Decatur, Ill., plans to replace its pioneer soybean oil Expeller plant with a new and modern solvent extraction plant at a cost of several million dollars. The new plant will be built on a site adjacent to the company's present solvent extraction plant, completed in 1945.

The new plant will not increase the total soybean processing capacity, but will replace the old Expeller process with the newer and more efficient solvent process. Higher oil prices and acute competition have made the large Expeller plant uneconomical. The company was faced with the problem of either increasing present extraction capacity or decreasing the volume of soybeans processed. The solvent process yields more oil and less meal per bushel



Wide World

Expect 'Hopper Invasion

USDA has prepared this map to show where the expected 1949 grasshopper invasion will hit hardest. Predictions are based upon surveys made last year. Gray-lined spaces indicate the menacing areas, black spaces the serious spots. USDA task force is getting set with two new poisons, planes, and trucks.

than does the Expeller process. This process, a comparatively new one in the industry, is achieved by "washing" the oil out of flaked soybeans with hexane.

The company's engineers have not yet determined how the new equipment will be installed or the amount of building construction involved. Many of the steam, power, water and railroad facilities serving the existing extraction plant will be available for the new project.

DISTRIBUTION

Brannan Support Formula Boosts Farm Income

The new Brannan plan, which would tie government support operations to maintenance of cash farm income ignores the flexible U. S. high rigid fight by giving the boys something new to chew over.

Brannan takes average annual purchasing power of total farm cash receipts over past ten years and divides by parity formula for each year to get a base. For 1938-49, this figures out at $18,200,000,000. This base is multiplied by the latest current parity figure of 1.44 to give a national farm income standard of $26,200,000,000, for 1949. This income standard for 1949 turns out to be 1.25 times average cash receipts of farmers for the 10 years 1940-49, or $20,900,000,000.

So to get a support price for a commodity, you multiply the 1940-49 average farm price of the commodity by 1.25.

Support prices under this plan would be substantially higher than 90 percent of parity as figured either under today's parity formula or the new parity formula of the Aiken Law.

Brannan would use regular loans and purchases for basics, but wants what he calls production payments for perishables—i.e., direct payments to farmer to make up difference between income support standard and the price the crop brings in the market.

He also goes all-out for acreage controls and marketing agreements and he wants authority to use them on fruits, vegetables, meat, and animals as well as grains and cotton.

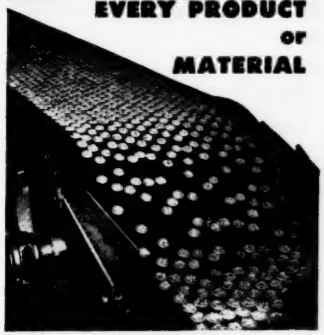
Plan would set a ceiling of 1,800 production units per farm that would be eligible for government supports. An established unit of corn, for instance would be 10 bu., for wheat, 7.7 bu. Thus a farmer would be entitled to government loans up to 18,000 bu. of corn. Total units work out to an income of about $20,000 to $25,000 per farm.

Price Supports No Cure For Citrus Industry

Price supports for the citrus industry are not feasible, in the opinion of the USDA. Ralph S. Trigg, Assistant Secretary of Agriculture and president of the Commodity Credit Corp. presented this view at the National Orange Show, San Bernardino, Calif., asking some cogent questions: "How far would controls have to go? How could prices be supported without encouraging new plantings? Where could

(Industry News Continued)

THERE'S A Cambridge
WIRE BELT
to combine movement with processing
for
EVERY PRODUCT
or
MATERIAL



Crackers by the thousands pour from the oven on a Cambridge Balanced Belt. Open mesh permits free heat circulation . . . moving endless belt gives continuous production of a uniform product . . . maximum time savings.

Whether your product is big and bulky or small and fragile, if it must move during processing or production, a Cambridge Woven Wire Conveyor Belt can do the job.

Woven from any metal or alloy to any mesh or weave, Cambridge belts offer dependability, long life, freedom from time-wasting shutdowns for repairs. Among the specially designed Cambridge belts in service today are continuous conveyorized installations for baking, quenching, tempering, washing, drying, cooling and packaging.

Whenever you have a problem concerning movement during processing, call in a Cambridge Field Engineer.

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Drake OWNER-MANAGEMENT assures you that this service will always be prompt, courteous. Our personnel strive to make your stay with us a delightful experience in warm hospitality, personal service.

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General Manager

the LOOP
and the LAKE
Meet at the
DRAKE
Chicago

Wide World

Winning Sons of Winner

Victor P. and Max Rasmussen, along with a third brother, Reuben, were the winners of this year's Pillsbury Wheat Growing Championship, with an entry of red winter wheat of the Cache variety. Their father, Philip P. Rasmussen, was 1946 winner.

disposal outlets be found? Would the citrus industry be ready to make necessary sacrifices and assume the responsibilities that price supports would entail?"

Trigg pointed out that orange trees are perennials and oranges are perishable. Both factors make the product different from "staple" commodities. He also mentioned the help the industry is already receiving through government purchases, marketing agreements, and research.

Another speaker, F. R. Wilcox, assistant manager of the California Fruit Growers' Exchange, declared that California's best remedy is to concentrate on developing and packing high quality, premium price, fresh fruit, leaving processing to Florida and Texas where it can be done so much more cheaply.

To this end, it is important that current researches on the causes of small-size citrus, now being conducted by USDA and private industry, be pushed to a successful conclusion.

West Europe Fish Catch Cuts U. S. Exports

A marked increase in production of fishery products in the countries of Western Europe has contributed largely to the reduced export market for U. S. processors and canners.

Figures reported in a study financed by RMA show that the fish catch in Western Europe, in 1948, was about 12,300,000,000 lb., which is 10 percent larger than 1947, and 34 percent larger than the 9,200,000,000 lb. average catch of these countries during the prewar years 1934 to 1938. The increase was made possible by the rebuilding and modernization of fishing fleets after the war.

Fish canning facilities are also being increased in Africa, according to Arthur M. Sandberg, marketing specialist of the F&WS, who made the on-the-spot study.

Also responsible for the decrease in U. S. exports: Government officials of the Marshall Plan countries have placed fishery products in the "non-essential" class, largely because alternative products could be obtained from non-dollar countries.

Coming USDA Research Will Aid Processor

From here on it is safe to expect more and more emphasis on directing Department of Agriculture research into the channels likely to produce benefits to the food processor. Projects will be aimed at more efficient, lower cost marketing, and expansion of farm crop utilization by industry and consumers.

The straw in the wind is the new role given the 11-man National Advisory Committee, established in accordance with the provisions of the Research and Marketing Act. While the Secretary of Agriculture is, by law, chairman of this advisory group, its scope during the first two years of its existence, had been limited to research financed solely by Research and Marketing Act funds. At the council's last meeting, its name

was changed to Agricultural Research Policy Committee, and its function now includes advising Secretary Brannan on all research of the $30,000,000 per year Agricultural Research Administration.

House Committee Checks On RMA Activities

Research work of the Department of Agriculture, during the the year beginning next July, will follow pretty much the pattern established when the Research & Marketing Act was authorized back in 1946.

The House Appropriations Committee has voted RMA an increase of $5,150,000 over this year, bringing its funds for fiscal 1950 up to $19,000,000. At the same time, it has held down the research funds of the Agricultural Research Administration to about the same level as this year.

The money voted by the House committee for ARA is as follows: Office of Experiment Station, $7,784,458; Bureau of Animal Industry, $22,097,000; Bureau of Dairy Industry, $1,093,000; Bureau of Plant Industry, Soils, and Agriculturing Engineering, $8,022,480; Bureau of Entomology & Plant Quarantine, $10,398,000; Bureau of Agricultural and Industrial Chemistry, $5,653,550.

While some changes are possible in the money figures from Senate action for increases or decreases, the House figures are likely to set the general level of funds that will finally be voted.

The House committee took three stands, which will guide the expenditure of Research & Marketing Act funds in the future (see story, preceding page).

1. It specifically provided that no part of the RMA appropriation be used for construction of any building costing more than $15,000. RMA has financed the construction of three or four labs, totaling as much as $200,000 each. This may no longer be done.

2. It criticized RMA for allocating its funds to the regular agriculture research bureaus. Said the committee, "Regular appropriations for the bureaus have been substantially augmented by allotments from RMA appropriations. Many of these allotments are for research projects that are so similar to the projects carried on in the past from regular appropriations that it is frequently very difficult to distinguish between the old-line research project and the new project set up under the allotments from the Research and Marketing Act. There have been instances where the Congress has made specific reductions in appropriations for the regular bureaus which have

(Industry News Continued)

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Half-hearted PACKAGING SENDS *Costs* SKYWARD!

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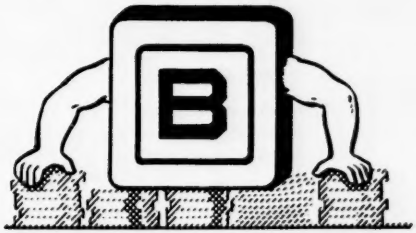

HOLDS 'EM DOWN

Any half-done job costs you money. This is particularly true in the packaging and processing fields where contamination robs producers of thousands of dollars every year. A good box or package is often not enough . . . that is why you owe it to yourself and your product to test the fine protective qualities of Bareco Microcrystalline Waxes . . . for many years the leader in the field of Package Protection.

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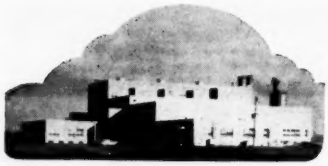
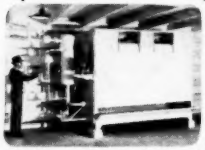


BIG NEW DAIRY PRODUCTS PLANT EQUIPPED WITH Frick Refrigeration

The M & R Dietetic Laboratories, Inc. will manufacture SIMILAC, the well-known baby formula, and TEN-B-LOW, a concentrate for making ice cream in the home, in their new plant at Sturgis, Michigan.

A complete Frick refrigerating system serves the great plant.



Frick Unit Cooler in One of the Freezer Storage Rooms

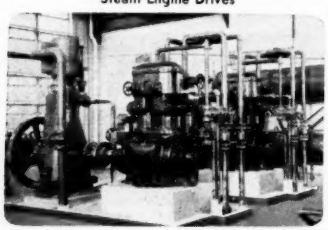
Temperatures range from 10 deg. below zero to 40 above. Features of the cooling system are steam drive for two of the compressors, a booster compressor for low-temperature work, and two cold water tanks arranged for storing refrigeration by freezing ice on the pipe coils.

Cold Water Tanks, with Pumps and Ammonia Control Equipment

For that special cooling problem of yours, look to

DEPENDABLE REFRIGERATION SINCE 1853 FRICK CO. WAYNESBORO, PENNA. U.S.A.

Frick 11" by 10" Ammonia Compressors, with Steam Engine Drives



been offset—in some instances more than offset—by allotments from the Research & Marketing Act appropriation." Congress wants no more of this, which is one of the big reasons why it insists that RMA submit specific projects to the appropriations committee, so that Congress will know exactly what the money it votes will be used for.

3. It strongly recommended that RMA use to the fullest extent its authority to contract its research work to outside organizations. The committee said, "Utilization of the contract authority in connection with this work will tend to prevent the excessive building up of government personnel in the regular bureaus of the Department, and the committee is certain the Congress itself desires to limit the growth of the departmental establishment as much as possible within the requirements of the work to be done."

Tax Repeal in 26 States Is Next Margarine Aim

House passage, last month, of the oleomargarine bill would not only repeal all federal taxes on margarine, but would impose no restrictions on interstate shipments of colored margarine. The bill does require restaurants, hotels and other commercial eating places to serve margarine in the form of a triangle and calls for a sign in such establishments notifying patrons that margarine is being served.

There is little doubt that the Senate will pass the House bill, or something very much like it, if it ever gets to the floor. Question is whether the Senate is willing to devote any amount of its time to this legislation. The butter senators are about 25 strong, and they could tie up the Senate's business for an estimated 10 days in debating the bill. There was some doubt in mid-April that the pro-margarine senators could find a place for the measure in the tight Senate timetable.

Federal restrictions, however, are only part of the margarine story. Regulations in 26 states range from the mild Massachusetts imposed annual levy of 50c. for a retailers license to the stiff Wisconsin across the board taxation seen in the table below.

Margarine License Fees And Taxes (Corrected To March 22, 1949)

	Prohibiting Yellow Margarine		Levying Excise Taxes (per lb.)		Levying Annual License Fees			
Restrictive Laws	Manufacture	Sale	Yellow	White	Retailers'	Wholesalers'	Public Eating Places	Manufacturers'
Federal (All United States)			10¢	¼¢	Yellow: $48 White: $6	Yellow: $480 White: $200		$600
California	✓	✓				$50	$2	$100
Colorado						$25		$25
Connecticut	✓	✓			$6	$50	$3	$100
Delaware	✓	✓						
Idaho	✓		10¢	5¢	5¢	$25		
Illinois		✓						
Iowa	✓	✓		5¢				
Massachusetts					50¢			
Minnesota	✓	✓			$1	$1		$1
Montana	✓	✓				$20		$5–$20 depending on production
Nebraska		In Public Eating Pl.			$1	$25		$100
New Hampshire	✓	✓						
New York	✓	✓						
North Carolina		In Public Eating Pl.				$75		
North Dakota			20¢	10¢	$2 (2 yr.)	$5 (2 yr.)		$10 (2 yr.)
Ohio	✓	✓						
Oregon	✓	✓						
Pennsylvania	✓	✓			$2	$2	Hotels $2, Bdg. Houses $2	$2
South Dakota	✓	✓		10¢				
Utah			10¢	5¢				
Vermont	✓	✓			$2–100	$25		
Washington	✓	✓						
Wisconsin	✓	✓		15¢	$25	$500	Hotel or Restaurant $25, Bdg. Houses $5, Bakery $5, Confect'ry $5	$1000
Wyoming	✓	✓						
State Totals	17	18 2 Other States: In Public Eating Places	3	6	9	12	4	9

Prohibition Of Use By State Institutions. State supported institutions are prohibited from using margarine in California, Idaho, Iowa, Kansas, Minnesota, Montana, New Hampshire, New York, North Dakota, Pennsylvania, Washington and Wisconsin. In addition, Connecticut, Illinois, Michigan and Nebraska permit limited use. The prohibitions in New York and Iowa have been temporarily suspended.

Pickle Week Is Official

Harry Conley, National Pickle Packers' president, gets around the feminine reluctance to be chosen Pickle Queen by having this athletic young lady boot a symbol of the product. Probably you get a much prettier girl into the picture this way.

Vegetable Oils Adequate Despite Low Stocks

Supplies of vegetable oils, basic ingredient of salad dressings, will be adequate for the 1949–50 pack despite the 250,000,000 lb. decrease in stocks during 1948. Good growing weather and high prices farmers still obtain for soybeans, cottonseed, corn and peanuts were credited for this optimistic view of speakers at the Mayonnaise and Salad Dressing Manufacturers' Association Convention, in Chicago.

As a direct result of the high level of all stocks, allocations for export will be increased. While sales figures for 1948 still have not been compiled, total consumption of the four basic oils was 222,000,000 lb. higher in 1948 than in 1947, according to Charles E. Lund, Chief Foodstuffs Div., U. S. Department of Commerce.

With an eye to increasing sales of salad dressings, Theodore Marks, president of the Association, reported that the public relations committee has established college and university research scholarships. A one-year fellowship will begin at the University of Maryland, Home Economics Department, for testing new methods of preparing mayonnaise, French dressing and salad dressing and incorporating these products in new recipes for nutritious menus. At Stephens College, Columbia, Mo., the home economics department will also create new uses for salad dressings. Tested recipes will be given to the Association for consumer distribution.

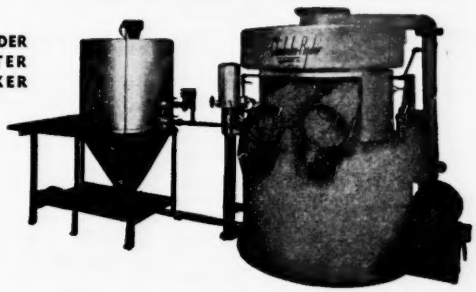
(Industry News Continued)

Chisholm-Ryder

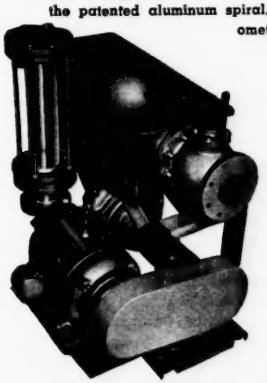
Quality Food Processing

Two CRCO Units . . . Designed to Increase Quality and Reduce Operating Costs on Pea and Lima Lines

CRCO QUALITY GRADER WITH GRAVOMETER AND BRINE MIXER



The CRCO Quality Grader positively insures a greater recovery of tender or fancy peas and lima beans from field runs with a consequent increase in profits. Gives better, faster separation according to specific gravity than is possible by any other method. Now available for immediate delivery with the patented aluminum spiral, all-aluminum tank, new air-operated gravometer and brine mixing tank in a complete unit.



CRCO HYDRO LIFT

New Hydro Pumping Unit To Move Product

Designed to pump products for canning or freezing from one operation to the next, regardless of height or distance. Has one-third greater capacity than a 3-inch unit, yet costs no more!

Unit consists of 4-inch Hydro Lift with stainless steel hopper, quick-opening float valve and pyrex sight glass, CRCO Rod Washer and a new CRCO Scavenger Reel and Supply Tank.

Send for complete details and prices.

THE BEST OF Everything

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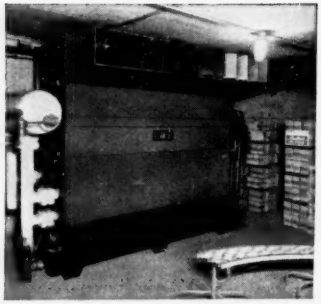

Do you want COST-REDUCING Refrigeration?

The Niagara "No Frost" Method saves you from any loss, delay, shutdown, or diminished efficiency from frost on your refrigerating coils, at any time. You always get the full capacity that you paid for when you bought your refrigerating plant.

See how this means money savings. You run with higher suction pressures and lower head pressures, saving power. Your wear and tear and maintenance is lower; you save the loss of production and the labor used in defrosting periods. You save the power that is wasted when refrigeration is supplied through coils that are frost-coated.

The Niagara "No Frost Method" is not just a means of defrosting. It is a means of operating refrigeration without the formation of frost at any time, reducing costs, quickly paying for itself.

There are hundreds of successful "No Frost" users who say it is saving money, increasing production and improving quality for them every day . . . in every type of refrigeration installation requiring temperatures below freezing . . . in food freezing, ice cream, cold storage and in special industrial applications.

Write for Niagara Bulletin No. 105 for further information

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Wide World

Japanese Sanitation

American machinery, being installed by the military government, is helping to teach the Japs present day sanitation methods. This automatic bottling machine has replaced the usual dipper, or hand manipulated rubber hose. The workers' "uniforms" have yet to gain the attention of the Americans.

PROCESSING

Dairy Application of DDT Frowned On by F&DA

When DDT is used on dairy cows, or in dairy barns, or other places where milk is handled, a public health hazard is created. This is the general conclusion of Food and Drug Administration. As a result, Department of Agriculture now strongly recommends that DDT should not be used for insect control on dairy cows or in any places where milk is handled. Even spraying of barns when the cows are not present is criticized.

Previously the Department had cautioned against using DDT and related chlorinated hydrocarbons where these insecticides could get into the milk or even into the animal feed. But more drastic restrictions are now believed necessary to avoid getting traces of these "toxic" chemicals into the milk. It is known that DDT used on the skin of the cattle is absorbed and transferred to milk. It is known also that ordinary use for fly control in dairy barns may give detectable small amounts in the milk.

Recommended as a substitute is methoxychlor which is "another effective insecticide" believed safe. "A number of new insecticides are under investigation by Department entomologists . . . " Also suggested is pyrethrum, especially if used with piperonyl butoxide, which increases its effectiveness. Also useful for fly control elsewhere on the farm, are several insecticides, including DDT. But these should not be used in the dairy barns or milk-handling rooms. Recommendations for restriction in milk areas do not apply to other stock including beef cattle.

F&DA Food Standards

Except for the *bread* standards hearing, reported elsewhere in this issue, Food & Drug Administration's food standards program was fairly quiet during March and April.

Canned potatoes were the subject of a one-day hearing on March 14. A number of industry representatives testified in favor of permitting certain calcium salts as optional firming ingredients in the present standards. No serious controversy developed, so a tentative order permitting this amendment of the standards is expected shortly.

Canned corn was discussed for eight days in the middle of March, then a recess was taken until April 7. Evidence on the proposed standards of identity, quality, and fill of container was presented first by F&DA, since the hearing was called on the initiative of the Administrator. Industry evidence was then presented in part before the recess. Additional evidence is expected on resumption of the hearing. However, there appeared to be the possibility that a further recess would be requested until 1949 pack data could

be studied. Whether this request would materialize and be granted, was not known before going to press.

Cheeses, salad dressings, and frozen fruit tentative orders were still expected, in about that order. More than usual delay in issuing these orders is due in part to the voluminous record established in each case.

Pineapple standards may be the subject of a hearing rumored for later this year. No official announcements had been made up to April.

Ice cream standards have been rumored for a long time. Present expectation is that no hearing will be held before the Fall of 1949.

More imminent is a hearing on *DDT* toxicity. Recent action taken by F&DA and USDA to avoid food contamination with DDT have been termed "precautionary". Food & Drug Administration hopes to determine the extent to which traces of DDT in the human diet may be hazardous. Notice of this hearing will appear in the *Federal Register* as usual.

Bread Hearing Continues

Consideration of bread softeners has occupied most of the time of the F&DA bread hearing since it was resumed on March 21. Toxicological data were submitted by several pharmacologists. Bakers also spoke of practical considerations involved in using bread softeners. At the time this was written

(Industry News Continued)

Wide World

What's In a Name, Forsooth?

It's been quite a spell since that man in Stratford-on-Avon asked, but the cottage cheese people have finally come up with an answer. The lady is demonstrating cottage cheese cones. Her Title: Miss Cottage Cheese Cake.

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it seemed that most of the month of April would be devoted to this subject.

Some observers are predicting that bread softeners will not be permitted by F&DA as optional ingredients. Reasons given are (1) that the materials are still relatively new and not yet proven completely safe for all diets; and (2) that consumers are fooled into thinking that soft bread is fresh bread, even though the fresh flavor may have disappeared.

Consideration of mono- and di-glycerides was scheduled to follow the polyoxyethylene esters. A recess was tentatively planned for a few weeks beginning in early May.

Consideration of oxidizing agents may come before the recess. But final adjournment of the hearing is not expected, even by the most optimistic, before June.

Foreign Matter in Flour Found by New Method

A new way to detect insect parts and other foreign material in flour and other milling products has been discovered at Kansas State College, Manhattan, Kansas by Dr. H. T. Gier, associate professor of zoology, D. A. Wilbur, associate professor of entomology, and G. D. Miller, assistant professor of milling industry.

A blue stain, azure 1, was found by Dr. Gier to stain insect fragments pea green while staining all other materials such as plant hairs and bran flakes dust blue. The technic was further refined in cooperation with Professors Wilbur and Miller.

Using the azure 1 stain, millers may now determine the extent to which their products are adulterated and check through their processes to eliminate foreign matter.

The milling industry has been baffled for a number of years because it had no readily applied method of detecting insect parts in flour and other milling products.

Processing Method Found For Citrus Molasses

Citrus molasses, byproduct of grapefruit and orange juice canning plants, is now being processed by submerged combustion, according to E. M. Burdick, director of research of Texsun Citrus Exchange, Weslaco, Tex., and associates in the Ozark-Mahoning Co., Tulsa, Oklahoma.

The process, as described at the Los Angeles Regional Meeting of the American Institute of Chemical Engineering, consists of heating or evaporation through utilization of an open submerged flame. This method has been found particularly useful in the treatment of solutions containing scale-forming salts. Heat is transferred to the liquids and solids undergoing heating by the hot gaseous products of combustion.

Used for concentrating pulp press liquor into citrus molasses, the new submerged burner prevents the liquid from sticking to the pan.

Early Reservations Made By IFT Exhibitors

Exhibitors for the 9th annual meeting of the Institute of Food Technologists were still seeking space at the end of March. With the meeting slated for July 11 to 14, in the San Francisco Auditorium, booths had already been reserved for the following:

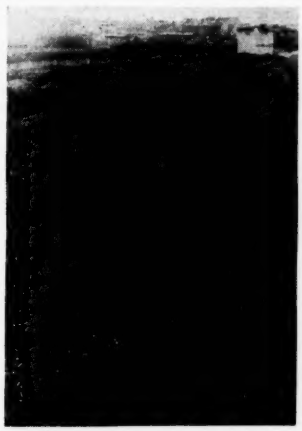
Allis-Chalmers Co., Milwaukee, Wis.
America Optical Co., Scientific Instrument Div., Box A, Buffalo, N. Y.
Atlas Pacific Engineering Co., Emeryville, Calif.
Atlas Powder Co., Wilmington 90, Del.
Barry-Wehmiller Machinery Co., St. Louis 15, Mo.
Basic Vegetable Products, Inc., San Francisco.
Bausch & Lomb Optical Co., Rochester 2, N. Y.
Benner & Nawman Co., Oakland 8, Calif.
Brewers Yeast Council, Chicago 14.
E. C. Buehrer Associates, Inc., San Francisco.
California Fruit Growers Exchange, Los Angeles.
California & Hawiian Sugar Refining Corp., San Francisco.
California Ultraviolet Co., San Francisco.
Calresin Corp., Culver City, Calif.
Cherry-Burrell Corp., Chicago 6.
Columbia Engineering Service, San Francisco.
Continental Can Co., Oakland 1, Calif.
Corn Products Sales Co., San Francisco.
The Creamery Package Mfg. Co., Chicago, 7.
Food Industries, New York 18.
Food Machinery Corp., San Jose, Calif.
Foxboro Co., Foxboro, Mass.
Fritzche Bros., Inc., Los Angeles 14.
Gentry, Inc., Los Angeles.
Girdler Corp., Votator Division, Louisville, Ky.
Glass Containers Manufacturers Inst., San Francisco.
Glyco Products Co., Inc., Brooklyn 2, N. Y.
The Griffith Laboratories, Inc., Chicago 9.
M. O. Grove Co., San Francisco.
Huron Milling Co., New York 7.
International Minerals & Chemical Corp., Chicago.
King Sales & Engineering Co., San Francisco.
Laboratory Equipment Co., San Francisco.

Merck & Co., Inc., Rahway, N. J.
Minneapolis-Honeywell Regulator Co., Brown Instruments Division, Philadelphia.
Mojonnier Bros. Co., Oakland, Calif.
National Starch Products, Inc., New York 16.
Neptune Meter Co., San Francisco.
Oakite Products Co., New York City.
Chas. Pfizer & Co., Inc., Brooklyn, N. Y.
Philadelphia Quartz Co., Berkeley, Calif.
F. Ritter & Co., Dr. Alexander Katz Co. Div., Los Angeles 27.
Sellers Injector Corp., Philadelphia 30.
Spreckles Sugar Co., San Francisco.
A. E. Staley Mfg. Co., Palo Alto, Calif.
William J. Stange Co., Chicago 12.
Taylor Instrument Companies, Rochester, N. Y.
Walker-Wallace, Inc., Buffalo 9, N. Y.
Wallace & Tiernan Co., Inc., Belleville, N. J.
Winthrop-Stearns, Inc., New York 13.
Wyandotte Chemicals Corp., Wyandotte, Mich.

Food Tech Graduates

An attractive brochure, *Graduating Food Technologists of 1949* has been published by senior students in the Food Technology Department at Oregon State College. This is the third year that this effective "job application" booklet has been sent out to the food processing and allied industries. Copies of the brochure are available to anyone who writes into the Food Technology Department, Oregon State College, Corvallis.

(Industry News Continued)



Pilm Polski

Care For a Sugar Beet?

These sugar beets promise to keep things humming, even behind the iron curtain. They were piled up recently outside a sugar factory in Kruszwica, central Poland.

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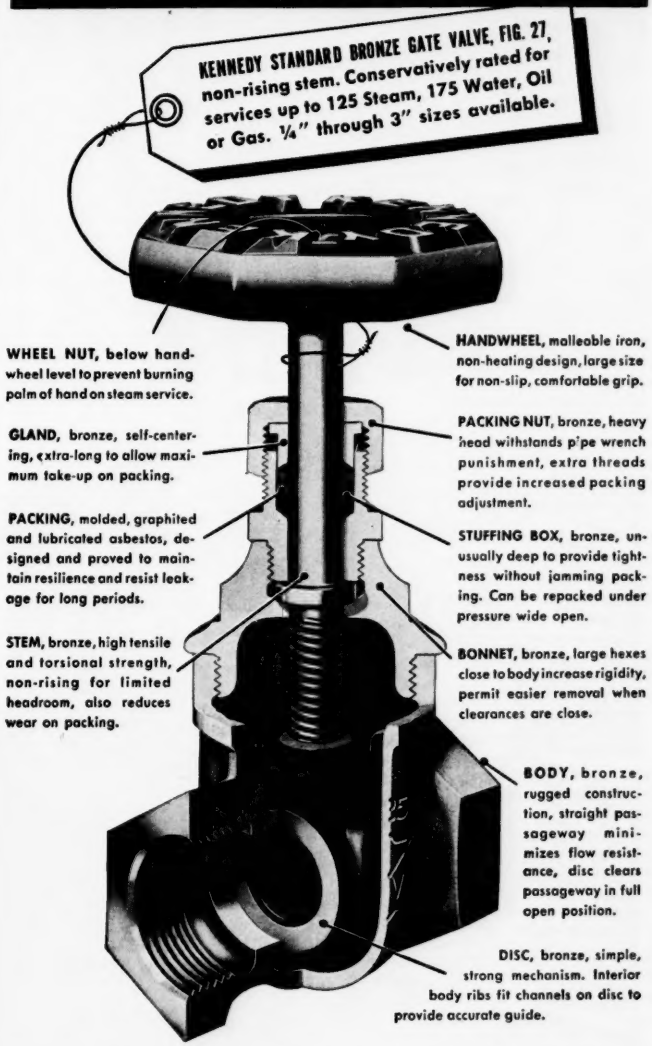
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GLAND, bronze, self-centering, extra-long to allow maximum take-up on packing.
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PACKING, molded, graphited and lubricated asbestos, designed and proved to maintain resilience and resist leakage for long periods.
STUFFING BOX, bronze, unusually deep to provide tightness without jamming packing. Can be repacked under pressure wide open.
STEM, bronze, high tensile and torsional strength, non-rising for limited headroom, also reduces wear on packing.
BONNET, bronze, large hexes close to body increase rigidity, permit easier removal when clearances are close.
BODY, bronze, rugged construction, straight passageway minimizes flow resistance, disc clears passageway in full open position.
DISC, bronze, simple, strong mechanism. Interior body ribs fit channels on disc to provide accurate guide.

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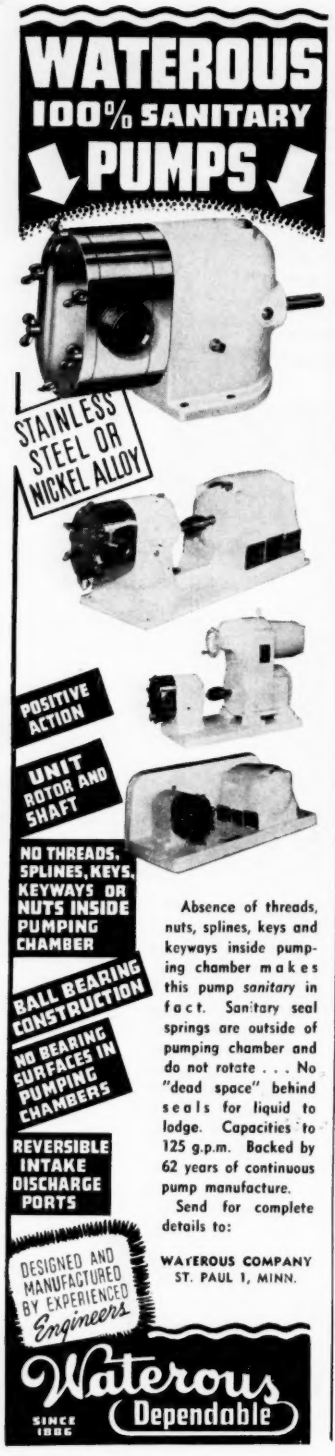
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Lab Extracts Feed Yeast From Citrus Waste

Removal of sugar from citrus waste by means of yeast cultures is being done successfully in the laboratory by scientists of the University of Southern California and California Fruit Growers' Exchange.

Yeast cultures are placed in the press liquor which results from making the pulp or rag of juiced citrus into stock feed. Nitrogen is added, and air pumped through the mixture. The process serves two ends. As it develops, the yeast uses up the sugar in the waste, sugar that would otherwise clog sewage treatment plants. The sugar, at the same time, fosters the growth of a yeast which increases the nutritional value of the stock feed. It is estimated that 300 pounds of yeast can be grown from 1,500 gallons of orange waste.

Since about a ton of sugar remains in the press liquor from every 1000 boxes of processed fruit, the average packing plant must otherwise dispose of some 10 to 12 tons of sugar daily.

Aussies Study Calcium In Bread Flours

MELBOURNE—If calcium is good for the teeth, it doesn't mean that the calcium contained in wholemeal bread ever gets at them, according to Australian nutritionists.

Researchers at the Institute of Agriculture, University of Western Australia, have found that wholemeal flours and breads are richer in a certain phosphorus compound than white flour and bread. The compound is known as phytate phosphorus. It is partly lost in the baking process, but the loss is much higher in bread baked from white flour than in bread made from flour of high extraction. The Institute suspects that the rate of loss is linked with the pH reading of the dough.

Phytate phosphorus is known to interfere with the body's calcium absorption. While the percentage of it in white bread is probably too small to affect the normal calcium intake, the investigators are not so sure about wholemeal bread. It may contain as much as 0.065 percent of phytate phosphorus and a 1-lb. loaf is theoretically sufficient to "immobilize" a large proportion of the daily intake of calcium. According to one authority, one part of calcium will form an insoluble compound with 1.1 to 1.6 parts of phytic acid. However, other dietary factors are also known to influence calcium absorption.

Canada Erases Ceilings On Most Food Items

OTTAWA—The Canadian government has announced that all price ceiling orders on flour, bread, butter, sugar, edible molasses, canned fruits and vegetables, and imported apples, celery, lettuce, onions, spinach and tomatoes, have been removed.

Likewise, the government has disclosed that all import quotas, imposed originally because of the serious shortage of U. S. dollars, have been increased from 28 percent to 44 percent for the second quarter of 1949 on prepared foods, with this change being due to improvement in the dollar situation in Canada. In addition, the import quotas on fruits and vegetables will be increased from the current annual rate of 70 percent of the base year to an annual rate of 80 percent.

The excise taxes of 25 percent plus 1c. per bottle on soft drinks have been repealed completely as well as such taxes on chocolate, candy and confectionery which were 30 percent and termed "nuisance taxes" by the press throughout Canada. The excise taxes, 50c. per pound, for carbonic acid gas are also repealed.

Hold Cocoa in Storage

RIO DE JANEIRO—Newspapers report that 750,000 bags of cocoa will be shipped from the state of Bahia to the U. S. for storage, awaiting a better price.

The recent low offerings have caused a crisis in Bahia, one of the world's great cocoa producers.

Kellogg Builds in Africa

JOHANNESBURG—Kelloggs, the cereal manufacturers, are erecting a factory at Springs, east of Johannesburg, to manufacture breakfast cereals from African grains.

The total outlay will be about £100,000 and U. S. manufactured machinery will be installed. At capacity, it should meet the demands of the South African, Southwest African and central African markets.

The factory will almost exclusively employ South Africans.

Springs has also another overseas

food process manufacturing company operating there. Maconochie Brothers, Ltd., the British firm, started production last November, and supplies of canned foodstuffs have already been delivered to dealers.

Maconochies are manufacturing essences, soups, pickles, mayonnaise sauces, cold meats and meat meals.

New High for Coffee

RIO DE JANEIRO—Brazil's coffee exports in 1948 reached a new high of 17,491,174 bags, by official figures.

This volume was achieved despite serious inroads of the coffee pest (hypothenemus hampei) and the exhaustion of much old coffee land.

Old stocks held by the government were, however, largely liquidated, and many coffee men doubt that 1949 exports can be maintained at the same level.

Unofficial estimates put the value of the 1948 coffee exports at $450,000,000, or roughly 40 percent of Brazil's sales abroad. The U. S. was by far the biggest market.

Coke Coolers for Brazil

RIO DE JANEIRO—General Motors of Brazil has delivered 2,000 electric coolers to Coca Cola in Brazil. They were made locally, using Brazilian materials except for compressors and tubing.

Coca Cola, which entered the Brazilian market only a few years ago after long opposition from other soft-drink manufacturers, has been successful in suiting Brazilian taste. Several other soft drinks have subsequently been launched here.

Powdered Milk Contract

MELBOURNE—New Zealand is shooting for a contract to sell more powdered milk to Britain. An official of the dominion's Dairy Products Marketing Commission is leaving for England to hammer out details. New Zealand's production of powdered whole milk and skim milk has increased five-fold in the last eleven years. It is worth $10 million a year.

Asiatic Milk Plant

BOMBAY, INDIA—The largest pasteurization plant in Asia, with a capacity of 40,000 lb. per hour, is to be installed at a milk colony at Aarey, 20 miles from Bombay city. The colony, opened recently, will be the biggest in India and will cost $12.9 million. It will have 30 units, each unit accommodating 500 head of cattle. Seven units are now ready, ten are expected to be ready by July and the remaining

(Industry News Continued)

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by March, 1950. Three other similar milk colonies are to be established in Bombay province.

Brazil's Milk Duty

RIO DE JANEIRO—Brazil's Congress has refused to permit duty-free importation of powdered milk, for which American manufacturers are campaigning. The action was taken in the face of a tariff-exemption recommendation by the Chamber of Deputies' Public Health Committee.

Schedule of Events

May

1- 4—Southern Bakers Assn., 35th annual convention, Peabody Hotel, Memphis, Tenn.

2- 5—U. S. Brewers Foundation, 73rd annual convention, Waldorf-Astoria, New York City

8-12—Supermarket Inst., 12th annual convention, Hotel Stevens, Chicago.

9-11—Millers National Federation, 47th annual convention, Edgewater Beach Hotel, Chicago.

10-12—American Oil Chemists Society, 40th annual meeting, Roosevelt Hotel, New Orleans, La.

10-13—American Management Assn., 18th annual national packaging exposition, Convention Hall, Atlantic City, N. J.

15-18—Flavoring Extract Manufacturers' Assn., 40th annual convention, Drake Hotel, Chicago.

15-19—American Assn. of Cereal Chemists, 34th annual convention, Hotel Statler, New York City.

17-18—Associates, Food & Container Inst., annual meeting, Navy Base, Norfolk, Va.

19—National Fruit & Syrup Mfgs. Assn., 32nd annual convention, Drake Hotel, Chicago.

20-28—National Pickle Week.

23-25—Associated Retail Bakers of America, convention and exhibition, Auditorium, Milwaukee, Wis.

30-June 1—U. S. Wholesale Grocers Assn., annual convention and exposition, Auditorium, St. Louis, Mo.

June

1-30—Dairy Month.

5-10—National Confectioners Assn., 66th annual convention and 23rd confectionery industries exposition, Stevens Hotel, Chicago.

6- 8—Grocery Manufacturers of America, mid-year meeting, Cavalier Hotel, Virginia Beach, Va.

7—American Assn. of Candy Technologists, Stevens Hotel, Chicago.

July

11-14—Institute of Food Technologists, 9th annual meeting, Civic Auditorium, San Francisco.

—*End*

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- V5 Victor monocalcium phosphate . . . rope preventive and bread improver ingredient. ☐
- V6 Victor dicalcium phosphate . . . mineral enrichment in graham crackers. ☐
- V7 Victor sodium acid pyrophosphate and monocalcium phosphate . . . leavening acid ingredients in prepared mixes for cakes. ☐
- V8 Victor disodium phosphate . . . emulsifier for process cheese. ☐

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Changes in Food Supplies

Production

CREAMERY BUTTER, produced in February, was estimated at 91,000,000 lb., 18 percent more than in February, last year, but 5 percent under the 1943–1947 average. Relationship to a year earlier was the best for any month since June, 1947. Production was off only 1 percent, seasonally, compared with a 2 percent January-February drop last year, and a 3 percent average decline for the five-year period.

ICE CREAM PRODUCTION, in February, was up 9 percent over January, which compares with the seasonal gains of only 1 percent that were recorded last year and in the recent five-year average. Output was estimated at 32,100,000 gal.

AMERICAN CHEESE production, estimated at 59,375,000 lb. in February, was down 2 percent from the January output, but on a daily basis showed a 9 percent increase. The 2 percent drop on the monthly basis compares with a 3 percent January-February increase last year, and a 4 percent rise for the five-year average.

LIQUID EGG production totaled 40,682,000 lb. in February, compared with 31,090,000 lb. turned out during February, 1948. Dried eggs produced in February amounted to 6,846,000 lb., as against 1,065,000 lb. in February of last year.

POULTRY canned or used in canning totaled 9,564,000 lb. during February, 15 percent less than the 11,285,000 lb. so used in February, 1948. Poultry certified under Federal inspection during the month came to 19,728,000 lb., as against 16,626,000 lb. in February, 1948.

EVAPORATED MILK production in February, totaling 160,650,000 lb., was the lowest for the month in 10 years. Canned condensed milk output, on the other hand, was the highest for February since 1930, reaching 10,300,000 lb.

GREEN BEANS packed in 1948 came to 12,685,816 cases, basis 24/2's. This was about 17 percent greater than the 1947 pack of 10,898,113 cases, according to the compilation of the National Canners Assn.

WAX BEANS packed in 1948 totaled 2,487,508 cases, on a 24/2's basis, which was a 14 percent increase over the previous year's pack of 2,192,727 cases, according to the National Canners Assn.

CHICKS HATCHED by commercial hatcheries during February attained a new high for the month, with an output estimated at 144,244,000. This was 47 percent above February, 1948, production, and 17 percent above the five-year average for the month.

Storage

FROZEN FISH AND SHELLFISH held in storage March 1 totaled 104,481,205 lb., a sizable increase over the 90,491,181 lb. held Mar. 1, 1948.

PUBLIC COOLERS were 49 percent occupied at the beginning of March, a drop of 3 points under February, and 17 points below the five-year average for the date.

FREEZER occupancy stood at 68 percent on March 1, exceeding the average February decrease by only 1 point. Occupancy, however, was 13 points below both the five-year average and the occupancy reported on Mar. 1, 1948.

Indexes

BUSINESS WEEK'S index of business activity rose to 194.2 for the week ending April 9. Previous week was 193.8; a month earlier, 195.0, and a year earlier, 183.1.

The commodity index for foods, compiled by the New York Journal of Commerce, stood at 181.6 for the week ending April 15, which compares with 182.8 for the previous week, 179.6 for March, and 199.3 for April, 1948.

CONSTRUCTION

	Pending (thousands)	Awarded April (thousands)	Awarded 1949 (thousands)
Bakery	$618	.....	$2,296
Beverages	444	$100	5,636
Canning and Preserving	.....	.....	115
Cold Storage	68	75	1,677
Confectionery	.....	.....	700
Grain Mill Products	400	136	2,473
Ice, Manufactured	70	.....	.....
Meats and Meat Products	75	750	2,621
Milk Products	1,161	.....	1,410
Miscellaneous	511	476	4,416
	$3,347	$1,537	$21,344

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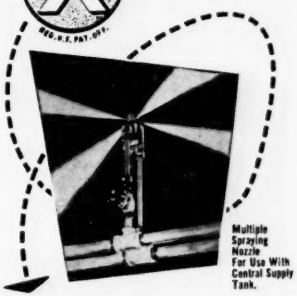

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Effective and safe, adopted by leaders in the food industry. Program includes plant surveys by trained experts, residual spraying, personnel training, periodic inspection and service. Permanent Spraying installations, completely automatic (as illustrated) or semi-automatic X-L-Jets (not shown) for granary insect or fly control. EXCELCIDE insecticides and rodenticides are non-toxic and non-contaminating... SAFE for food plant use. Users are insured by products liability and property damage coverage. Spraying equipment manufactured exclusively for us by Spraying Systems Company, Bellwood, Ill.

16 MM Sound colored Movie on Entire System Available on Request. Address:

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Creamery *Package*

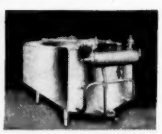
New CP UTILITY WASH-UP TABLE. All-Welded Stainless Steel. Built to take hard use. Dual Tray-Type 25"x 35" Flanged Shelves have drain holes at center and each corner.

CP Boosters and complete refrigeration equipment for foods, beverages, curling rinks and other purposes. 2, 4 and 6 cylinder CP Compressors.

Sanitary Solid Frame Power Conveyors for dairy and food industries. Interchangeable sections and units simplify assembly . . . make changes or additions quick and economical at any time.

CP Stainless Steel Multi-Process Tanks. Ideal for pasteurizing mixing and cooling liquid products. Vapor or Film Heating.

CP Fort Atkinson 40 Qt. Direct Expansion Batch Freezer. Famous for fast freezing, accurate overrun control. Available for use with Freon or Ammonia.



CP Wizard Cold Wall Tank. For direct expansion cooling (with Ammonia or Freon) and holding liquid products. Cold wall sections built integrally.

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CREAMERY PACKAGE MFG. CO. OF CANADA, LTD. — TORONTO

What Washington Thinks

By R. S. McBride, Washington, D. C.

MARRIED WOMEN—More married women have been gainfully employed during the last year than previously. Over 48 percent of the 17,000,000 women workers are reported as married, by Labor Department data. If there are any personnel offices still prejudiced against such women, they certainly are handicapping themselves by an old fashioned prejudice.

GET YOUR MAN!—Government records show that the national enrollment in college and university work has been higher recently than ever before in history. This means availability, in June, of a larger number of technically trained college graduates for the food business than ever before. There is even a little evidence that food companies will have a better chance this year to get some of the best graduates, since a number of the heavy engineering industries are not filling as many new technical jobs as usual. It is a good time right now to go get your needed young men, and women. Waiting till June, or until some second rate chap applies for a job, is bad policy.

TRAINED FISH—Some of the scientists at the University of Wisconsin have found out how to train minnows to detect water pollution. The blunt-nosed minnow is taught to expect food when in water containing traces of phenol. Of course, we don't expect a goldfish bowl as an auxiliary of every plant superintendent's office. But we are interested to know that such fundamental scientific aids for detection of stream pollution are being seriously studied.

In view of new Federal activity, it is evident that even more serious attention will have to be given by many food plants to means of prevention of pollution, not merely detection after it has occurred.

BYPRODUCT FEED—Milk herds fed a mixture made up wholly of byproducts from southern crops "produced as much milk and cost less than a standard mixture containing 70 percent of grains." This result from USDA's dairy groups indicates that byproduct recovery at food plants may be very profitable both to the food company and to the customer dairyman. In this particular case, the byproducts recovered were citrus pulp, dehydrated sweet potatoes, peanut meal, and cottonseed meal. But it is obvious that the conclusion applies to a much wider variety of food byproducts.

TAXES ARE GUILTY — Recent changes in parity price for farm commodities have been less than expected. The decline in prices of goods purchased by farmers has been offset to a small degree by increased rates of interest and to a larger degree by increase in taxes. If the federal, state and local governments keep on upping taxes on farmers we cannot expect them to break even or get "parity" incomes even though feed, seed, other materials and farm labor all decline in cost. This sounds very much like the problem of an industrialist. Washington and state capitols will unquestionably ignore the fact and hope that other folks do not discover it.

FRESH WATER—Difficulty in getting pure water uncontaminated by the invasion of the sea has become so important that members of Congress are beginning to consider legislation on the subject. One proposal is that Bureau of Reclamation study various methods of distilling salty or brackish water to make it fresh, in order to find out how costs may be reduced. On Long Island, on the Texas Gulf Coast, and in Southern California, the problem is a very practical and imminent one. Overpumping of ground water is already making many wells yield a brackish supply. Food plants needing fresh water in these areas are, of course, deeply concerned. Other areas may be affected sooner than they realize.

FLAVOR RATING—"The flavor rating is the most important consideration in grading butter." This is an official comment from the Department of Agriculture. Perhaps it would be more useful to the readers of FOOD INDUSTRIES if it were stated, with equal truth, as: "Flavor rating is the most important consideration in grading any food." Processing that hurts flavor is bad technology.

SCIENCE FOUNDATION—One important item of legislation seems to have escaped the controversy between the Senate and the President. During mid-March, the Senate passed a bill which would establish a National Science Foundation. Washington observers think that the House is likely

to concur, and surely the President will sign if he gets a chance. Thus, the concept of more research for national well-being gets, as it deserves, important official recognition.

REVIVING CHEMURGY — During the days when all foods were scarce, chemurgy was not so important. There was then little need to make non-food products from food raw materials, since these were definitely scarce items, not surplus. The situation is rapidly changing.

Every food enterprise must now consider non-food byproducts or co-products very seriously. They represent profit opportunity, which is important. They also represent opportunity for stabilization of the food business by diversity of product, especially non-food co-products.

As agricultural surpluses accumulate and threaten all commodity markets, this idea of stabilization may be of more immediate concern than the question of small changes in the profit of the individual company. Washington knows this and is again aggressively talking chemurgy, which we like to define a bit narrowly as the art of making non-food products from agricultural food raw materials.

PRESIDENT'S POINT IV—"Export of know-how" has proven an interesting catch phrase about Washington. Everybody likes the idea of helping backward areas become more productive; but almost no one has any very practical methods for doing it. However, State Department effort is now being made to get specific proposals underway with proper diplomatic and financial encouragement. Anyone who can bring a suggestion of a specific business activity that might thrive in some particular backward area can well bring the project to Washington for consideration.

SURPLUS FATS AND OILS—Domestic production of vegetable fats and oils has been climbing steadily. Despite our generous exports, the supply for U. S. users is easy, though as yet not quite generous. But a secondary effect is developing that is causing jitters in Washington and among farm leaders. Surpluses of byproduct seed meal, even surplus of oil seeds like peanuts, are quite imminent. Anyone who can suggest new uses in industry or for novel foods will be received most cordially at the Department of Agriculture, which is responsible for primary public planning on this surplus problem. A bit of private planning among those of us who might use vegetable proteins seems also in order.

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● What is your humidity conditioning problem? If the requirements are in the range up to 50% relative humidity at 80°F you will want a Kathabar System to accurately control it for you. Some installations operate as low as many degrees below zero without frosting.

Kathabar Systems are engineered and installed to live-up to design conditions. Kathabar Engineers know the importance of controlled humidity to processing and comfort atmospheres and are committed to follow-through to give results.

That's why customers continue to buy Kathabar Systems as new needs arise. There are as many as 20 units in one particular plant. These were repeat orders over a period of 6 years. There are other such examples, too!

Kathabar Systems have been proved in industry. If you have a humidity condition that you want to control, specify Kathabar.

GET THE FACTS • Ask a Kathabar Humidity Engineer to tell you about Humidity Conditioning. Let him present proof of Kathabar System reliability and dependability. Get the facts first-hand!

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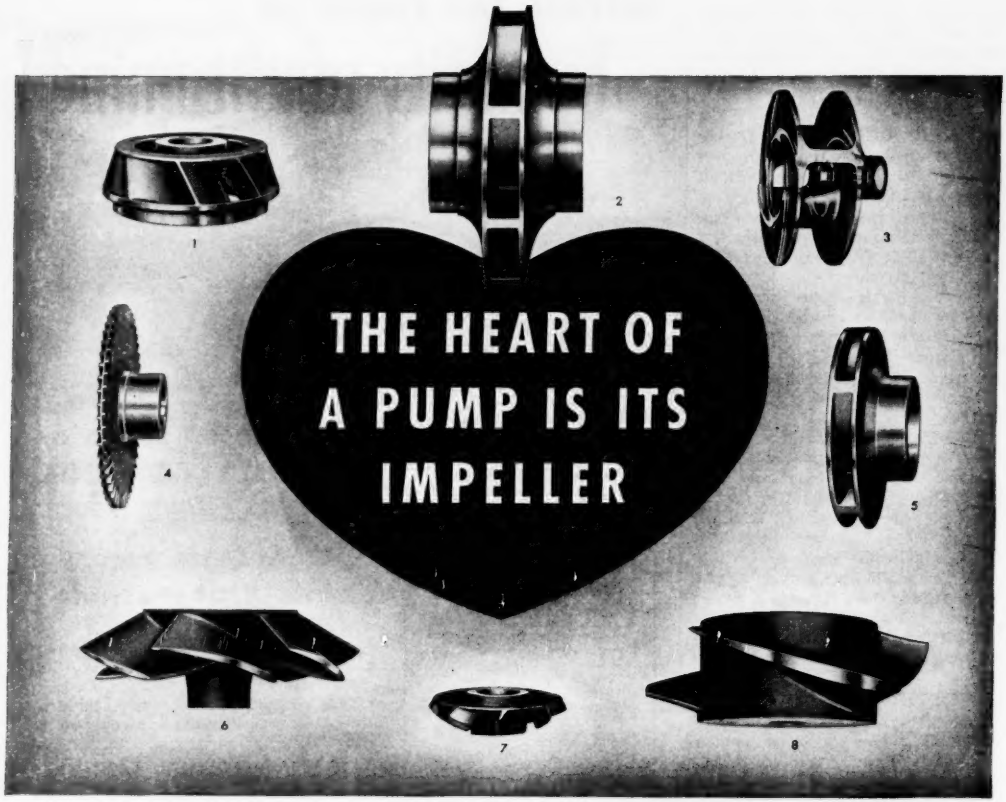

Peerless Pumps utilize many different impeller designs to meet various fluid conditions

What makes a pump "tick?" Its heart is an impeller!

Pictured above are eight Peerless impeller designs for varying fluid conditions. No. 1 forces water upward from deep wells. No. 2 is a double suction design for high capacity horizontal pumps. No. 3 pumps solids in suspension. No. 4 handles all liquids in small capacities, at high heads. No. 5 is of single suction design for process services. No. 6 combines both radial and axial flow. No. 7 is a semi-open impeller for small diameter deep wells. No. 8 is an impeller that "propels" large liquid volumes.

The point is—capacities, lifts, heads, temperatures, chemical analysis, clarity, shaft speeds are seldom common to different pump services and installations. Because fluid conditions vary, Peerless pump designers are versatile and Peerless pumps utilize this versatility in different impellers for varying fluid conditions, successfully pumping most liquids in all industries.

Peerless horizontal pumps are available for general purpose pumping, for handling sewage and other materials in suspension, for most all process services, for moving chemicals and oils, for acids and caustics and for such specialized applications as l-p gases.

Peerless vertical turbine pumps are available for lifting water from deep wells or close-coupled for wet or dry pit installation and for drainage, drydock, canal diversion and flood control services.

Plan with Peerless for all your needs for pumps. Individual descriptive Bulletins on each of the types of Peerless Pumps described above are available upon request.

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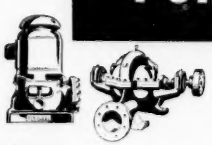
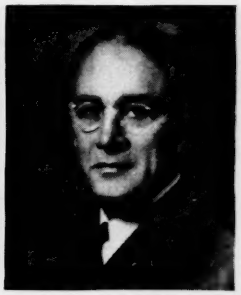


Men, Jobs, Companies

JOHN G. BRERETON, formerly technical director of Sheffield Farms Co., Inc., has been appointed manager of the firm's chemurgic division. He will head sales, production and engineering.



CLIVE C. DAY, president of Peter Cailler Kohler Swiss Chocolates Co., Inc., New York, N. Y., was re-elected president of the Association of Cocoa & Chocolate Manufacturers of the U. S.

BRUCE WATSON (left) **and CHARLES B. COATES** (right) figured prominently in a recent General Foods Corp. personnel change. Watson was appointed assistant director of the firm's department of public relations. He succeeds Coates, who resigned to accept an appointment as vice-chairman and general manager of the Citizens Committee to Reorganize Executive Branch of Goverment.

Industry

The Great Atlantic & Pacific Tea Co. has opened a new coffee roasting plant in Baltimore. Unit has a capacity of 500,000 lb. weekly and will serve the chain's stores in District of Columbia, Virginia, Delaware, Maryland and Pennsylvania.

Babcock Honey Co. has been incorporated at Columbia, S. C., with a capital stock of $50,000.

Burton Milling Co., Inc., is a new firm recently established at Talladega, Ala.

Central Soya Co. has announced plans for construction of 20 new storage tanks at its Gibson City, Ill., plant. New facilities will have capacity for 1,200,000 bu. of grain.

Davie Juicing Co., Inc. has been granted a charter for operations in Fort Lauderdale, Fla.

Canned Chop Suey Foods Industry has scheduled a national promotion for May 5 through June 4. Publicity will be given by Can Manufacturers Institute, National Livestock & Meat Board, Poultry & Egg National Board, and American Meat Institute.

DeSoto Canning Co. has established a plant at Arcadia, Fla., to convert citrus waste into livestock feed.

Felber Biscuit Co., Columbus, Ohio, is constructing a $300,000 brick and concrete addition that will increase present floor space by 30,000 sq. ft. With this enlargement, the firm expects to triple its output.

Flavoring Extract Manufacturers' Assn. of The U. S. is holding its 40th annual convention at the Drake Hotel, Chicago, May 15 to 18.

Foremost Dairies, Inc., one of the major organizations in the ice cream and milk business in the East, Southeast and Southwest, has merged with Maxson Food Systems, Inc. of New York City. The new company will be known as Foremost Dairies, Inc.

Frosted Foods & Sea Foods, Inc., has been organized at Fond Du Lac, Wis. W. J. Steffen will be president.

Kuner-Empson Co. and **D. L. Reed Co.,** Colorado food processors, are reported entering an agreement for the packing and marketing of 300,000 lb. of frozen lima beans. Product will be marketed under the "Skyland" label.

Lever Bros., Toronto, Ont., is reported making plans for a $1,000,000 oleomargarine plant if the Ontario government does not ban yellow coloring of the spread.

Libby, McNeill & Libby, Chicago, announces that its Eureka, Ill., plant will not be operated this year. Pumpkin was one of the principal packs there. The company will continue to buy canning crops in the area, but will can them at the Morton, Ill., plant.

Melville Confections, Inc., Chicago, has sold all stock in the firm (formerly held by outside interests) to the employees of the company and has elected a new board of directors.

The Milwaukee Cheese Co. has acquired the Kraft swiss cheese plant of Monroe, Wis.

Morton Salt Co. is planning construction of a $3,000,000 plant in Grand Saline, Tex.

Miss Muffet Preserving Co. has been incorporated in Detroit for the manufacture of jams, jellies and preserves.

Oceanic Foods Co., Houston, Tex., has announced plans for construction of $600,000 fish canning plant. Tuna fish will be canned. Freezing units will store 1,000 tons of fish.

Hubert M. Smith Packing Co., Muskegon, Mich., has been incorporated for $200,000 as a meat packing business.

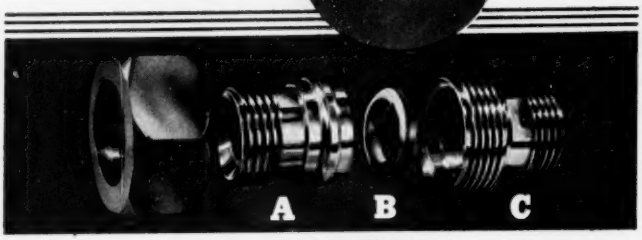
Omar, Inc., Columbus, Ohio, in its $1,000,000 expansion program has installed an oven (reportedly the world's largest) which can turn out 120 loaves of bread per minute.

Republic Doughnut Corp., Dallas, Tex., has begun production in its new factory. Completely automatic throughout, the plant represents an investment of $100,000.

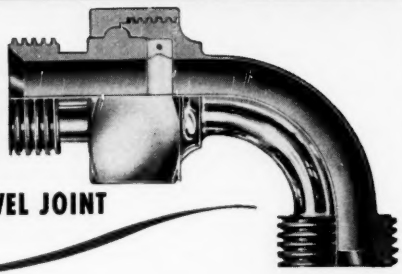
Schlitz Brewing Co. of Milwaukee has

(Men, Jobs, Companies Continued)

Simple as A B C



The CHIKSAN SANITARY SWIVEL JOINT



So simple in design and construction that a simple picture tells the whole story. That's the **CHIKSAN Sanitary Swivel Joint!** It provides complete flexibility for easy turning without leaking and for absorbing vibration, expansion and contraction without strains on pipe, equipment and connections. In addition you get the long life, safety and ease of cleaning inherent in stainless steel. You save money, too, because **CHIKSAN Sanitary Swivel Joints** give you unlimited service at low maintenance cost.

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Cherry-Burrell Corporation
Creamery Package Mfg. Co.

Write for Illustrated Bulletin

CHIKSAN TRADE MARK

CHIKSAN COMPANY
AND SUBSIDIARY COMPANIES
Chicago 3 · BREA, CALIFORNIA · New York 7
WELL EQUIPMENT MFG. CORP. HOUSTON 1, TEXAS
MID-CONTINENT AREA
CHIKSAN EXPORT CO. BREA, CALIFORNIA · NEW YORK 7

BALL-BEARING SWIVEL JOINTS FOR ALL PURPOSES

CHARLES A. JOHN, formerly affiliated with Associated Seed Growers, Franklin, Ind., has been named head of Crop Research Department of H. J. Heinz Co. He will headquarter at the firm's experimental farm and plant breeding grounds at Bowling Green.

purchased the George Ehret, Inc., brewery of Brooklyn, N. Y. An estimated $6,000,000 will be spent on construction and new equipment for the new property.

A. E. Staley Mfg. Co., Decatur, Ill., is making changes and additions which will increase capacity of its present power plant by 21 percent. When completed, the additions will enable the plant to generate and distribute 17,000,000 lb. of steam per day and will carry a peak electrical load of 14,500 Kw.

Standard Brands, Ltd., has begun to expand its facilities at Ingersoll Cheese Co. plant, Hamilton, Ont. Plans include installation of processing and packaging equipment to be used in making oleomargarine.

Valley Shrimp & Packing Co. has been chartered in Brownsville, Tex.

Personnel

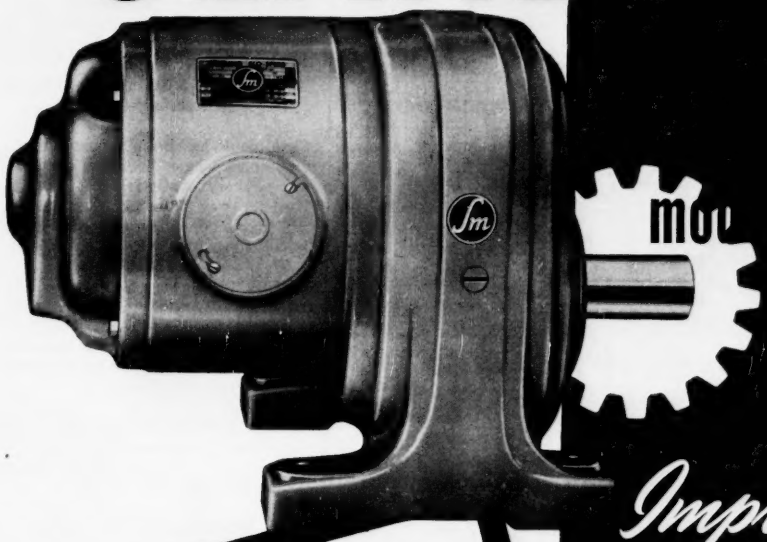
John Ballantyne, Best Foods, Inc., was elected chairman of Niagara Frontier Section of the American Assn. of Cereal Chemists at a recent meeting in Buffalo, N. Y.

Albert C. Beaulieu has been appointed general manager of Mount Royal Dairies & Co., Ltd., Montreal P. Q., Canada.

Jim Gorman, formerly with H. Gartenberg & Sons, Chicago, has joined

(Men, Jobs, Companies Continued)

GEARED



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Improved

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UNDIVIDED RESPONSIBILITY . . . Experienced engineering — precision helical gears — liberal ball bearings — splash lubrication — and rugged construction are combined in this one compact, sturdy, dependable unit.

Improved Sterling Slo-Speed geared motors are available with single and double reduction gears in a wide variety of ratios.

Use the improved Sterling Speed-Trol—where "speed control" — faster or slower — is required.

Where constant normal speed is required, use the improved Sterling KLOSD-TITE FAN-COOLED; KLOSD-TITE ENCLOSED; KLOSD-FACE-MOUNTED electric power drives.

STERLING ELECTRIC MOTORS

GENERAL

New York 7 • Chicag

Seattle 4 • Cleveland 15

Milwaul

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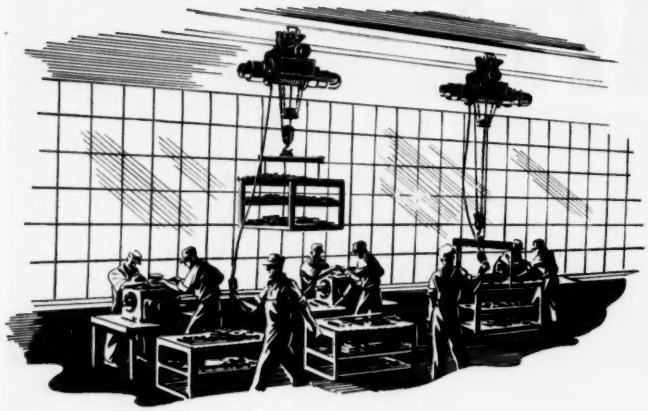
BREAK ASSEMBLY LINE BOTTLENECKS BEFORE THEY FORM



Be sure there is enough lift power and speed to feed parts or sub-assemblies to the main line at the correct tempo.

Will your need be for overhead cranes? What capacity? Or hoists? How large? How operated? From cabs—or from the floor with pendant controls?

The man best qualified to help you answer these queries is the Shepard Niles specialist. He has reference data to cover the performance of all three—and his mind is unprejudiced because he has sold all three for years. Let him help you plan!

SHEPARD NILES
CRANE AND HOIST CORPORATION

Makes and sells all three lifting tools for airborne shop loads.

422 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

Men, Jobs, Companies

the staff of National Egg Products Assn., Chicago. He will serve as industrial chemical engineer and will study the effectiveness of various egg washing procedures and machinery.

Officers of the American Society of Bakery Engineers elected for the term of 1949-50 include: Harold Moody of Ralph's Grocery Stores, Los Angeles, as president; Don Copell of Mrs. Wagner's Bakery Co., Newark, N. J., as 1st v.-p.; Glenn E. Hargraves, of Paniplus Co., Mount Prospect, Ill., as 2nd v.-p.; and Victor E. Marx of American Dry Milk Institute, Inc., of Chicago as secretary-treasurer.

Carl Slenk has been appointed production manager of the Columbus, Ohio bakery of Omar, Inc. Charles Durham was transferred from the firm's Indianapolis plant to become bread superintendent at Columbus.

I. M. White has been elected president of the newly organized Logan County Canning Co., Paris, Ark. Construction of the canning plant is expected to be completed in time for fall crop of peas and snap beans.

E. W. Tiedeman has been re-elected chairman of the executive committee of the board of directors of National Dairy Council.

Alan Wiedersum has been promoted to the post of assistant general manager of Sunshine Biscuits, Inc., Long Island City, N. Y., bakery.

Floyd Wheeler, of Minneapolis, was elected chairman of the board, and William Toohey, of Chicago, the president of Wheeler Barnes Co., Minneapolis syrup and preserve firm.

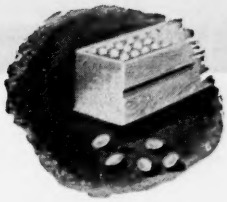
Warren L. Wollrab has joined the A. E. Staley Mfg. Co., Decatur, Ill., as a junior development engineer. Other appointments to the firm's staff include: William R. Eichenberger as a research chemist, Donald E. Paul as a junior research chemist, and Richard C. Hansen as food technologist.

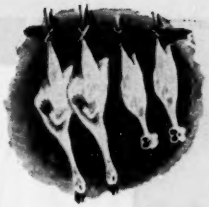
Associated Industries

Baker Refrigeration Corp., South Windham, Me., announces election of T. S. Pendergast as a director and president of the firm.

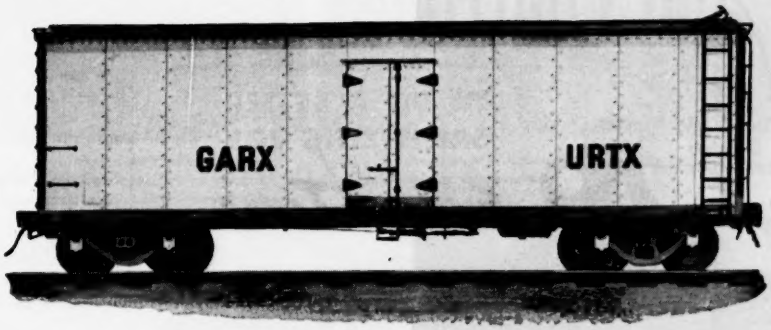
Brooks Rotameter Co., Lansdale, Pa., announces appointment of John G.

(Men, Jobs, Companies Continued)





Along with many other specialized types of General American cars, this refrigerator car serves the nation's shippers.

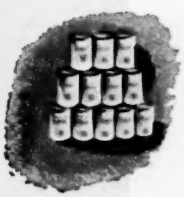


GENERAL AMERICAN

Whether you ship fruits or vegetables, meats or liquids, there is a General American Refrigerator car equipped to handle your products.

To serve you further, General American representatives located in most major producing areas are ready to help you solve your own individual shipping problems quickly and economically.

So whatever and wherever you ship, you may take advantage of General American's 50 years of experience serving the nation's shippers. And you may rely absolutely on General American's outstanding reputation for complete dependability.



GENERAL AMERICAN TRADE MARK

builds and operates specialized refrigerator cars for shipments of all kinds of perishables

UNION REFRIGERATOR TRANSIT LINES, MILWAUKEE

A Division of General American Transportation Corporation, Chicago 90

Laboratory Tested and Controlled

TO DO A BETTER SANITIZING JOB

EVERY TIME

The ORIGINAL Quaternary Ammonium Germicide

243189R

POTENCY
UNIFORMITY
QUALITY

Insist on getting only

GENUINE **Roccal** BRAND SANITIZING AGENT

USES IN FOOD INDUSTRY

To Sanitize:

- STORAGE BINS
- FREEZING UNITS
- REFRIGERATORS
- CONVEYORS
- TANKS
- PROCESSING EQUIPMENT
- PACKAGING EQUIPMENT
- TRUCKS
- WALLS AND FLOORS
- WASH ROOMS
- AND AS A HAND RINSE FOR HELP

In the Food Industry, the importance of using only the best in sanitizing methods cannot be over-emphasized.

In Roccal, the *original* quaternary ammonium germicide, the food industry is offered a sanitizing agent that is laboratory controlled and tested. The uniform quality of Roccal means uniformly good results in doing a proper sanitizing job.

Roccal is a powerful germ-killer. In recommended dilutions, it is non-poisonous, virtually odorless and tasteless. It is non-irritating to the skin and no more corrosive than plain water.

Roccal can be used for every sanitizing job in processing and packaging in the following food industries: milk, cream, ice cream, butter, cheese, egg breaking, sugar, fish, poultry, fresh frozen vegetables and fruits, meat products, cereal products, candy and beverage, wherever the product comes in contact with equipment. Also to keep walls and floors sanitary.

Start using Roccal today—you'll find that better sanitation is good business.

Fortify all your milk with DELTAXIN®—The purest known form of Vitamin D_2

SPECIAL MARKETS—INDUSTRIAL DIVISION

WINTHROP STEARNS — *Winthrop Stearns* INC.

170 VARICK STREET, NEW YORK 13, N. Y., Dept. W-59

Kirkpatrick as exclusive representative in the Pittsburgh area.

Owens-Illinois Glass Co. announces appointment of Harry J. Durholt as general manager of the Libby Glass Division. He succeeds Frank T. Nesbitt, vice-president, who has been transferred to the administrative staff.

Paperlynen Co., a division of the White Castle System, Columbus, Ohio, has completed a two-story addition to its factory.

Shellmar Products Corp. anounces appointment of E. F. Burke as eastern division sales manager.

Syntron Co., Homer City, Pa., announces establishment of district sales offices in Houston, Dallas, and Los Angeles.

Minneapolis-Honeywell Regulator Co. announces it has entered an agreement for acquisition of the H. Belfield Co., Philadelphia.

Deaths

Edwin Kirschbraun, secretary-treasurer of L. D. Schreiber & Co., Chicago and former president of American Butter Institute—of a heart attack Feb. 28.

Roud McCann, 62, for 20 yr. director of American Dry Milk Institute, Inc., Chicago—at his home in Highland Park, Ill., in Mar.

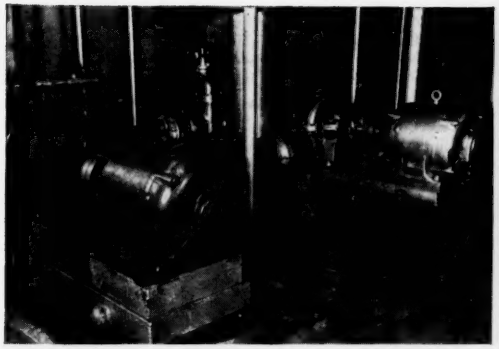
Joseph Manischewitz, 62, president of B. Manischewitz Baking Co., matzoh manufacturer, in Jersey City and Cincinnati—of a heart ailment after a long illness, Miami Beach, Fla., Mar. 28.

Ivan C. Morgan, 68, owner of Morgan Packing Co., Austin, Ind., and prominent Hoosier Republican—in Kentucky Baptist Hospital, Louisville, Ky., Feb. 26.

Neal S. Sells, vice-president of Food Machinery & Chemical Corp. and manager of the firm's Sprague-Sells Division—of a heart attack Feb. 19.

Willet Brewer Ranney, 57, retired vice-president of Wm. Wrigley Jr. Co., Chicago—after a long illness, in Chicago, Feb.

—*End*

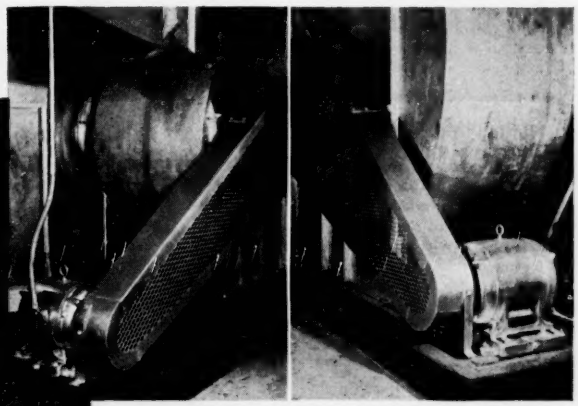


● Two Century 10 Horsepower Squirrel Cage three phase motors driving pumps — first is condenser water pump to dissipate heat; second pump circulates the cooled water.

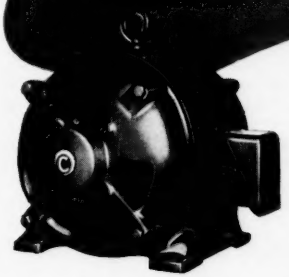
● 100 Horsepower Century Squirrel Cage motor driving a refrigeration compressor.

Thousands of Satisfied Users Specify

Century MOTORS - For All the Equipment on Air Conditioning Installations



● One 30 Horsepower and one 5 Horsepower Squirrel Cage motor driving cool air supply fans.



-822

They Start Quietly and Operate Quietly

Century motors are built to match the requirements of the equipment they drive. Multi-speed squirrel cage motors provide flexibility—wound rotor motors provide a wide range of speed control. A complete line of constant speed squirrel cage motors handles all normal installations.

Century Splash Proof frames protect the motor against the hazards of dripping or splashing liquids, indoors or outdoors.

Totally enclosed fan cooled frames furnish protection against destructive dirt that packs.

For atmospheres containing explosive gases and dusts, explosion proof frames are available.

Century builds a wide range of types and kinds of electric motors, in sizes from 1/6 to 400 horsepower, for operation on single phase, polyphase and direct current.

Specify Century motors for all your electric power requirements.

Popular types and standard ratings are generally available from factory and branch office stocks.

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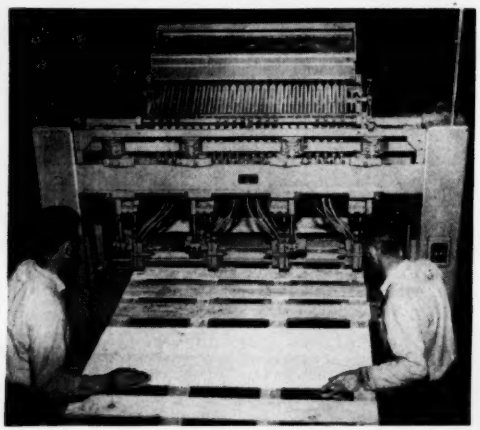
Offices and Stock Points in Principal Cities

Food Equipment News



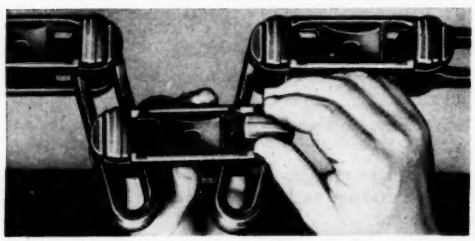
Nailing Machine

Large wooden assemblies such as pallets and shipping crates can now be made with production line efficiency by a versatile new commercial nailing machine. The design of this 24-nail drive, flat nailing and clinching equipment allows it to be tailored to meet many exact wood fabricating requirements.

At present, it takes only 10 min. to change over this new nailing machine to another operation, but the manufacturer believes that with new improvements being developed, it will be possible to change the nailer over for all types of operations in less time.

Although made to operate at 120 strokes per min., actual speed of the apparatus is dependent on skill of operator. It is designed to drive up to 24 nails in practically any nailing pattern. Machine is built in various widths to handle job widths up to 72 in. It uses 3 to 10 penny nails.

Style No. 366000, is 79 in. (max.) wide by 49 in. deep by 8 ft. high. Net weight, without table, is 2100 lb. It is equipped with a 5-hp., 1800-rpm. motor in any voltage or cycle required.—*Food Machinery and Chemical Corp., Riverside, Calif.*



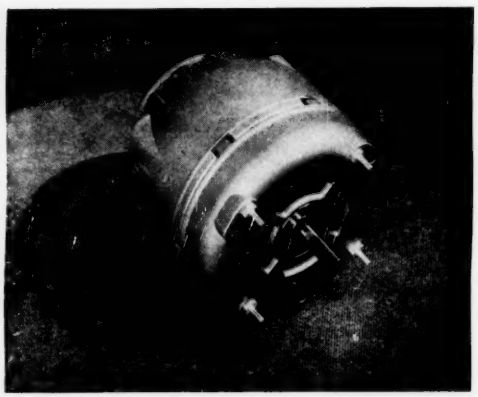
Conveyor Chain

Improvements in the design of rivetless chains for overhead, floor and drag chain conveyors have been announced.

Innovations are largely in the side link. This has a new type web which substantially stiffens the link. Restudy of design has also increased strength of chain without increasing weight per ft. X-458 is fully interchangeable with standard No. 458 4-in. pitch chain.

Chain is assembled and disassembled without tools. It has no rivets, welds or bolts, requires no special or joining links and may be disconnected at any point. Design is such that it does not become disconnected or telescope in service.

There are three components—center link, side links, and connecting pin. Open structure of chain, together with fact that center link or pin bearing area is in direction of load only, makes this chain serviceable in corrosive or dirty conditions. It is impossible for pins to freeze—chain remains flexible.—*Jervis B. Webb Co.,* 8951 *Alpine Ave., Detroit* 4, *Mich.*



Fractional HP. Motors

Designed for use on portable equipment is a new line of unit bearing, shaded pole, FHP Motors.

The new motors, Type KSP71, are available in these ratings: ¼ hp., 60/50 cycle, totally inclosed; 1/25 hp., 60 cycle, totally inclosed; and 1/15 hp., 60 cycle, open. All ratings are available for 115v. or 230v., and for cw or ccw rotation.

Suitable for use as drives for fans, blowers, and small pumps, they have die cast aluminum frames which weigh less than conventional types employing cast-iron frames.

Each of three ratings can be used for horizontal or vertical shaft operation; each can be obtained with identical outline features.—*General Electric Co., Schenectady* 5, *N. Y.*

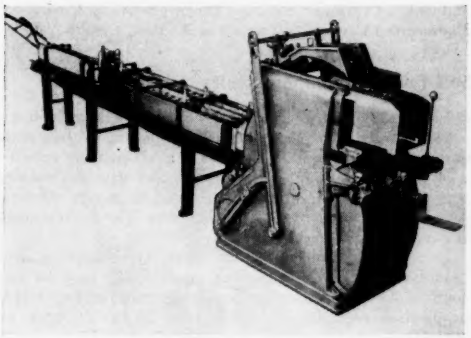
Cooling Water Control

A new design of self-operated, rigid stem type temperature regulator limits the flow of cooling water through engine and compressor jackets, hydraulic presses, vapor degreasers, condensers, etc., to maintain constant temperature.

It is the type where the warm water flows over the bulb, which is rigidly attached to a valve in the cold water supply, piped to the bulk location.

Special features include close-balance, double seated valves which provide accurate control without danger of sticking or chattering. A separable socket allows regulator to be removed for inspection without interrupting operation.

The installation is compact (no flexible tubing). Regulators come in sizes ⅜ to 1½ in. for water pressures to 150 psi.—*Sarco Company, Inc., Empire State Building, New York City 1.*



Automatic Case Loader

Designed to eliminate rough handling of containers at high speeds, an entirely new type of case loading machine has been developed. Here, containers are carried on ends standing upright. They are not rolled, and there is no sharp impact of one container against the other.

As a result, possibility of container damage, or break up or other damage to contents, is eliminated. Glass containers or flat-sided packages can be handled at same speeds and with equal safety as cans.

Machine comprises a feeder or line divider and a case loader driven by a single 1-hp. motor. Unit is fully automatic in operation, yet under complete control of operator when an empty case is fitted on loading chute. Filled case is automatically discharged onto a conveyor or truck, ready for warehouse or shipping platform.

In operation, incoming single line of containers is divided into four lanes. Twelve containers are removed from lanes, lifted upward, and placed horizontally in loading chute to form a tier. This operation is repeated to form a second tier. After second tier is formed, machine automatically stops and operator places an empty case on loading chute, actuates a switch, restarting machine.

A loading shoe automatically pushes two tiers into case, which is then lowered onto a conveyor or other suitable means for removing filled case. Simultaneously with this operation, two more tiers of containers are placed in loading chute.—*Food Machinery & Chemical Corp., Sprague-Sells Division, Hoopeston, Ill.*

Decanting Gear for Water Softeners

New gear is now announced for automatically lowering the swing-pipe decanting tube in the chemical agitating tank to feed chemical to the softener in proportion to the raw water flow.

Operation of the decanting gear is paced by the raw-water meter. The dial indicates the amount of chemical liquid in the tank. Connections are provided for the attachment of an electric low-level alarm.

The decanting tube is positioned by a flexible cable that is attached to the special shaped and grooved drum. Rotation of drum pays off cable and lowers decanting tube.

Contour of drum compensates for inaccuracy which would otherwise be introduced by radial path described by receiving end of tube during its downward travel.

When desirable to recharge chemical tank, decanting tube is raised to its starting position by cranking.

Drum is driven through oil immersed gears by a 1/40 hp. synchronous motor inclosed within housing. Motor is suitable for operation on 110v., 3-phase, 60-cycle current, although 50 or 25-cycle design can be furnished upon request.—*Worthington Pump & Machinery Corp., Harrison, N. J.*

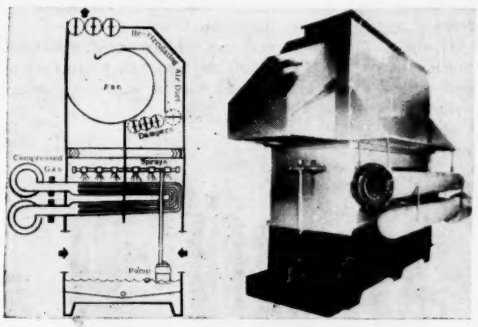
Improved Fluorescent Lamps

Users of fluorescent lamps are assured of economical operation without loss of lighting efficiency as a result of a change in the construction of the Sylvania 100w. 60-in. 717 fluorescent lamp.

While providing the same light output as the former model, the newly-revised 717 (2½ in.) consumes only 85w. of energy when operated with standard 100w. ballasts and auxiliaries. In addition, it burns as long as the former 100w. lamp and has the same maintenance characteristics.

Since no changes have been made in physical dimensions, the 85w. lamp is interchangeable with the 100w. unit in all 100w. fluorescent fixtures. The new-construction lamp is available in a complete line of colors, including daylight 4,500-deg. white, soft white, and Warmtone.

Present starter types FS-6, FS-64, COP-64 will operate either 85 or 100w. lamps.—*Sylvania Electric Products Inc., 500 Fifth Ave., New York City.*



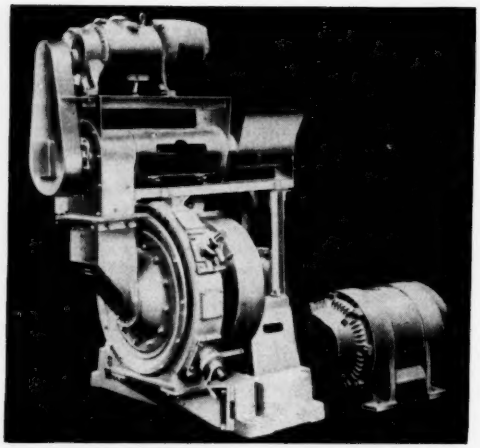
Compressed Air or Gas Dehydrator

Simplified in construction and protected from freezing in outdoor installation, new model Aero After Cooler dehydrates compressed air or gas by cooling it to a temperature below dry bulb temperature of atmospheric air. Thereby it removes the moisture that condenses at that point and prevents further condensation of water in air or gas lines in use.

Protection against freezing is given by the use of the "Balanced-Wet Bulb" control. A thermostat in the spray water reservoir is set for a desired low temperature limit, at which it operates dampers to recirculate the air stream internally around a division plate in the center of the unit, instead of drawing in freezing air.

This permits outdoor installations, to save space and give the benefit of the lowest wet bulb temperature in summer and provide cleaner air for the benefit of easier maintenance. Maker states unit consumes less than 5 percent of cooling water required by conventional coolers. No cooling tower is required.—*Niagara Blower Co., 405 Lexington Ave., New York City 17.*

(Food Equipment Continued)

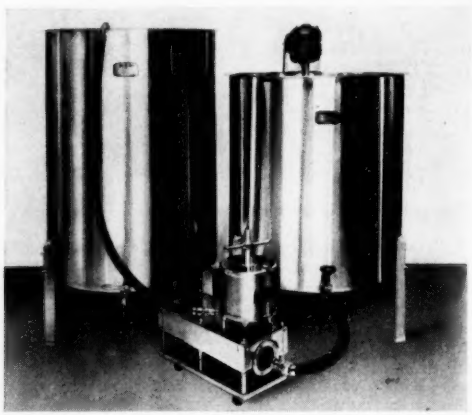


Pellet Mill

Increased production, lower operating costs, and capacity for pellets of all sizes (including range cubes) are offered manufacturers with the new S-W "Simplex" pellet mill.

Features of the new mill are a stainless steel feeder-conditioner; direct vari-speed conditioner drive; tramp iron protection where it is needed most; hardened pre-run dies; force feed; convenient external lubrication; and anti-friction radial bearings throughout.

If desired, the new mill can be furnished with the pneumatic system (Pneu-Vac) to take pellet away from mill without dust, moisture condensation, or soured feed.—*Sprout, Waldron & Co., Muncy, Pa.*



Stainless Steel Tanks

A new line of stainless steel storage and mixing tanks has been developed.

Special features are: Polished surface inside and out; sloping bottom—for complete draining; sturdy construction of solid, 16-gage, stainless steel; one piece welded, all rounded corners, crevice-free; side outlet nipple insuring fast draining; and low sides for easy loading.

The sanitary units have the mixers permanently mounted above the tank, and out of the way. Mounting protects the motor and all electrical connections from spilled or splashed liquids, from careless washing with the hose at the end of an operation, and also from damage.

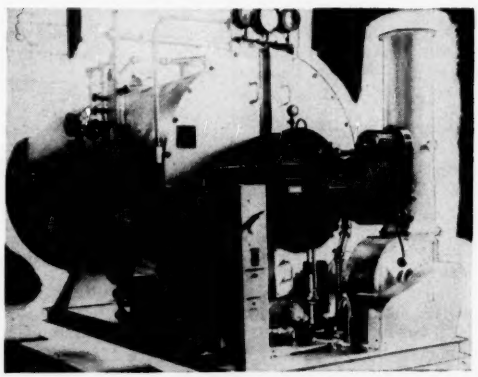
Heavy gage, stainless steel cover with slot for mixer shaft can be supplied for all tank sizes. Tanks are carried in stock, in sizes affording from 5 to 25 gal. capacity. Valves, faucets and liquid level gages, of different types and made of various metals and alloys, are available.—*Alsop Engineering Corp.,* 400 *James St., Milldale, Conn.*

Self-Priming Pumping Unit

Intended for use where electric power or belting facilities are not available, a new self-priming "packaged" pumping unit, known at Type LDA, consists of a self-priming centrifugal pump close-coupled to an air-cooled gasoline engine.

A double discharge volute is stated to assure efficient priming. A mechanical seal eliminates the conventional stuffing box and packing gland.

Pump is equipped with an open type impeller for dewatering service where some small solids may be encountered. Manufacturer recommends unit for any water application requiring capacities from 75 to 250 gpm. at a 110-ft. head.—*Gardner-Denver Co., Quincy, Ill.*



Packaged Steam Generators

Changing from gas to oil, or vice versa, can now be accomplished with new fully automatic combination unit steam generators. This feature enables the user to take advantage of the fuel in greatest supply at any given time.

Units employing a horizontal rotary oil burner change over to gas by swinging the oil burner open and inserting the primary gas burner in the normal oil burning firing port. This operation requires only a few minutes.

The primary burner is adjusted to handle a maximum of 25 to 30 percent of the total heat input. It is supplemented by a main gas burner in the form of an annular ring which is always in place inside the furnace extension.

Since jets of this main gas burner handle balance of total heat input, this arrangement of a primary and secondary gas burner utilizes full cross-sectional area of combustion chamber. Therefore it provides excellent distribution of gas-burning flame in fire box and furnace.

Generators offer fully automatic operation from high to low fire with all grades of commercial gas and oils, including Bunker C and No. 6 oil. All sizes can be fired with these fuels. Sizes range from 20–500 hp. and pressures from 15 to 200 lb.—*Preferred Utilities Mfg. Corp.,* 1860 *Broadway, New York City* 23.

FOR BETTER PACKAGING

Patapar Vegetable Parchment gives you better packaging in many ways. It has high wet-strength. It resists grease. Its protective qualities help keep foods fresh—appetizing.

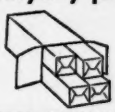
For sales appeal, Patapar's rich, white texture lends beauty and smartness. We give you color, too, by printing Patapar with bright, colorfast inks. Our plants are specially equipped for printing Patapar economically by letterpress or offset lithography.

May we design and submit a Patapar wrapper for your product?

Patapar REG. U.S. PAT. OFF.

HI-WET-STRENGTH, GREASE-RESISTING PARCHMENT

These are some of Patapar's everyday jobs



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CAN LINERS

VEGETABLE WRAPS

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Milk can gaskets
Fish wrappers
Oleomargarine wrappers
Cheese wrappers
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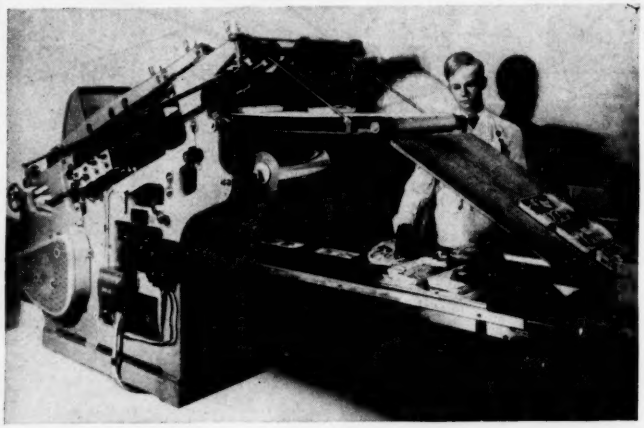


Wrapping Machine

Meat, provisions and delicatessen items can now be wrapped on a card, as well as in trays, with a new cellophane wrapping machine—the Model F.

Products are placed on cards or in trays, then fed to infeed conveyor of machine. A chain feed carries packages into machine. Wrapped items are delivered by means of a 3-ft. belt discharge.

Any type of card may be used that has a thickness of 40/1,000 in. Machine is quickly adjustable within following range of package sizes: 3¾ to 16 in. long, 3 to 8 in. wide, and ⅜ to 6 in. high.

It has a self-measuring paper feed which permits continuous wrapping of items which vary greatly in height. The over-all bulk of each package determines length of sheet that is cut from the roll of cellophane. In switching from one size to another, no adjustment is required for width of package. Hand-wheel adjustments for packages of different lengths can be made quickly by operator.

Model F occupies only 11 ft. 5 in. x 3 ft. 6 in. of floor space. Speed is 20 to 40 packages per minute, depending on package and product wrapped.

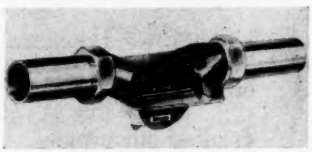
Machine has been especially designed to permit easy cleaning. Cellophane reels can be changed quickly and threaded with ease.—*Package Machinery Co., Springfield 7, Mass.*

Lift Truck Carton Clamp

Developed to handle goods in paperboard cartons by lift truck without the necessity of pallets, new carton clamp is one of several optional devices for the hydraulic-controlled Load-Grab.

This clamp is an attachment which squeeze-grips its load with just enough side pressure to lift without the need of pallets. Tines of device may be opened to a maximum spread of 59 in. and closed to a minimum of 14 in. Abrasive strips on metal plates prevent slipping of load. Clamp was designed for an efficient handling capacity of 1,700 lb. with company's "20" lift truck.

Other optional arms available are: Box-handling arms, drum-handling tines, rubber-faced arms, and conventional fork arms.—*Hyster Co., Portland 8, Ore.*



Magnetic Trap for Pipes

Installation in sanitary or standard piping of a new permanent Alnico magnetic trap is said to prevent tramp iron contamination of foods and liquids and damage to pumps, screens, fillers, and other equipment.

The trap is designed to remove tacks, nails, bits of wire and other tramp iron from such products as baby foods, juices, fruits and soups. The magnet is raised inside trap body to meet actual material flow. It has a large surface area to insure maximum iron removal capacity.

It is reported that magnet combines high magnetic strength with a controlled flux pattern that concentrates lines of magnetic force inside trap body. Effectiveness of the magnet is guaranteed for the mechanical life of

the installation. Magnet poles do not contact the liquid because they are covered by a polished removable stainless steel plate.

Assembly is sealed with a white dairy stock neoprene gasket, and the unit meets all sanitary requirements.

Trap body is designed to minimize turbulence and restriction to flow, is highly polished inside and out, and available in No. 316 stainless steel or Waukesha metal, with standard IAMD threads for easy installation.

Unit can be quickly and easily cleaned by removing wing nuts. Trap is available in sizes to fit 1-in. through 4-in. lines.—*Dings Magnetic Separator Co., 4740 W. Electric Ave., Milwaukee 14, Wis.*

Grinding Mill

Effective for preparing peanut butter, mayonnaise, spices, mustard, fish paste, candy, chocolate, and a wide variety of other foods, new grinding mill has simplified construction designed for continuous economical operation, fast external grind adjustment (in operation or not), and quick, easy clean up.

Operating principle is simple: Two small abrasive stones—one stationary, the other rotating at high speed—produce extremely fast, efficient grinding, shearing and dispersing action.

Mill is available with or without inside stainless steel finish, and in a wide range of capacities to suit most requirements.

Maker states that a variety of wet and dry materials has been successfully handled by this mill. In addition, special grinding surfaces have been developed for use where regular stones are not practicable.—*Hy-R-Speed, Inc., 11270 Riverside Drive, Los Angeles 31.*

(Food Equipment Continued)

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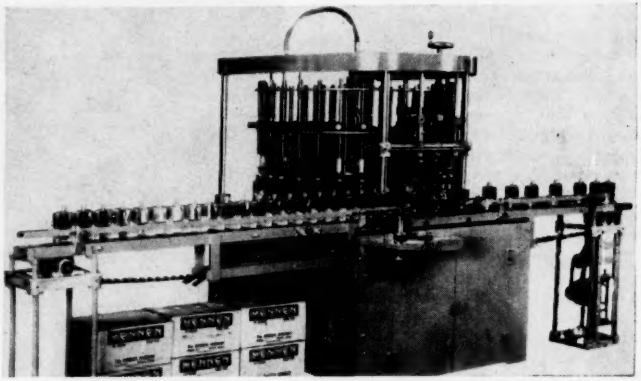


Automatic Liquid Filler

Metal or glass containers in sizes from fractional ounces to gallons, can be filled with thin, viscous, or foaming liquids by a new model, fully automatic liquid filler.

On actual test, 30-spout unit fills 3-oz. containers at a rate of 250 per min.

Production ranges reported by company are 250 fractional oz. per min., 180 pts. per min., and 150 qt. per min. Half-gal. and gal. can be filled up to 45 per min., using every other spout. These figures are based on water. This machine, like other MRM fillers, permits quick change-over from one size container to another.—*MRM Co., Inc., 191 Berry St., Brooklyn, N. Y.*

Laboratory Balance

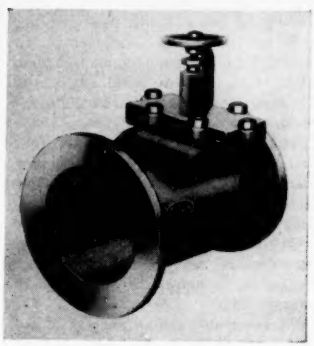
New instrument-making methods and materials have made possible a new torsion-principle balance for general laboratory use. Unit has a sensitivity rating of 2 mg. (1/32 gr.) and a capacity of 120 g. (4 oz.)

The torsion bands which balance the beam are of an alloy that is said to virtually eliminate the hazard of corrosion. The balance beam parts and all exposed metals are also corrosion resistant.

Instrument has large balance pans of polished stainless steel and a large beam graduated in figures that are easy to read. A single balance pointer moving across an index scale is angle-positioned for easiest possible reading.

Weighing is also speeded by the fact that no weights below 1g. (15 grains) are needed; the rider is sufficient for everything below this mark.

Beam graduations are in two parallel scales, one in grains, the other in grams—in black and red, respectively, to guard against confusion. The rider is so designed that it will not jar out of its setting unless the balance is subjected to considerable movement. In overall dimensions, new balance is generally similar to older models. It is 11½ in. long, 6 in. deep, and 6⅝ in. high.—*The Torsion Balance Co., Clifton, N. J.*



Discharge Check Valves

For use in industrial plants where back surge is a problem, a discharge check valve has been designed that protects against contamination of liquids, and fouling of pumps and equipment.

It reduces maintenance costs and prevents production difficulties in discharge lines which carry steam, sludge, waste water, and other waste liquids in gravity flow installations.

To minimize fouling of valve, this unit has a swing check flap suspended from a full floating pin fulcrum, insuring positive full surface contact between ground face of flap and flap seat. Knob in center of top surface of swing check flap contacts valve body roof at only one point when swing check flap is wide open. This assures free operation of swing check flap.

Location of swing check flap in relation to interior of valve body provides ample protection against possibility of sediment blocking valve. Swing check flap suspended from cover can be replaced and removed easily.

Discharge check valves may be operated with or without a manual control, or with an extension shaft or flexible cable from an access box. Units are hydrostatically tested.

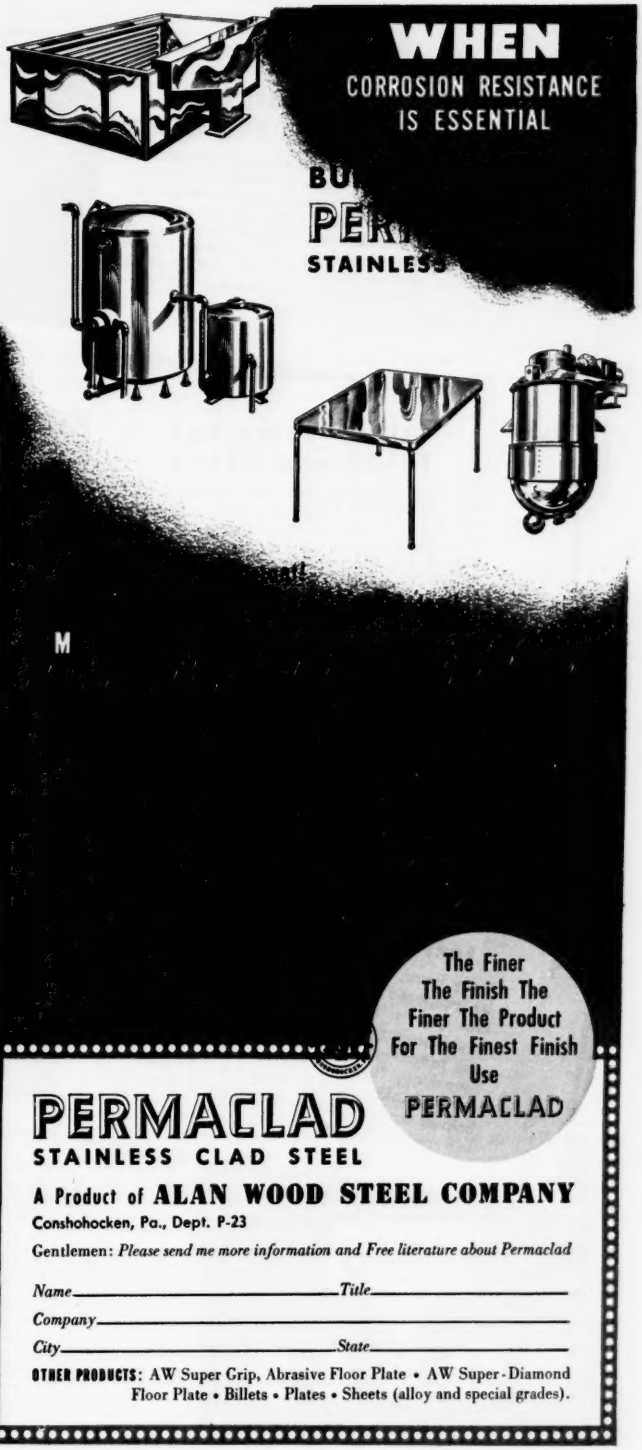
Flanges are 150-lb. flat faced and blank, or drilled as specified. They are available with 180,- 105,- or 90-deg. bodies made of cast bronze, steel, semi-steel, cast iron and alloy metals for corrosion resistance.—*J. A. Zurn Mfg. Co., Dept. Z-8, Erie, Pa.*

Dust Hood

Ample visibility is provided through a large, clear plastic window in a dust hood newly offered.

The fabric, supported by a head frame, covers and protects the face, head, and neck down to the shoulders. Hoods protect the worker from irritating and nuisance dusts or sprays in operations such as cleaning boilers, furnaces, or drying equipment, wherever dust, dirt or spray is objectionable. Hood may be worn with goggles or with respirator.—*General Scientific Equipment Co., 2700 West Huntington St., Philadelphia 32, Pa.*

—End



NO ICE REQUIRED for Fresh Seafood Shipments

One of the most significant packaging developments in the last decade is the H & D INSULPAK*, a corrugated box in which coast-to-coast airborne shipments of pre-cooled foods are made possible—*without refrigeration*. INSULPAK now makes all America a vast potential market for seafoods of all kinds. Daily delivery of fresh, perishable foods everywhere is now accomplished by this new, insulated package. It is hoped that it will soon be available for wide-scale distribution.

This Shipping Box TELLS and SELLS

Here's the famous Duplex shipping-display box developed by H & D for those manufacturers who wish to display their products—effectively and economically—at point of sale. It's a regular corrugated shipping box which the dealer opens to form a colorful counter display with a sales message that attracts attention and makes people buy. The H & D Duplex shipping-display box protects your product in shipment—sells your product in the retail store.

Good Packaging MAKES GOOD PRODUCTS BETTER

H & D PREPAK* Increases Unit of Sale

Many items, such as china and glassware, can be prepared at the factory into selling units that step up sales. Instead of selling one item at a time, Prepak* sells six, eight or twelve. Prepak promotes "take with" purchases, needs no repacking. The package illustrated contains a set of 8 glasses. It is made of light blue embossed corrugated board, printed in two colors, red and dark blue.

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Richmond 12, Va. • St. Louis 15, Mo. • Sandusky, Ohio
Toronto, Ontario • Watertown, Mass.

Catalogs, Bulletins

Food Plant Equipment

Canning Apparatus

Automatic consistency control machinery as well as stainless batch and blending mixers, a knife grinder, plunger filler, and shipping case loading machine are pictured and described with specifications in Bulletin 800-49.—*Food Machinery & Chemical Corp., Sprague-Sells Div., Hoopeston, Ill.*

Jar Sealing

Steam vacuum capping of 75 to 250 containers per min., ease of adjustment and economy are reported for new Steriseal machine in 4-page folder.—*Anchor Hocking Glass Corp., Lancaster, Ohio.*

Color Sorting of Foods

Automatic sorting by color, for product uniformity and quality in such foods as beans and lemons, is suggested in bulletin on Cox sorting machine. Economy in power consumption and labor is stressed.—*Electric Sorting Machine Co., 410 44 St., S.W., Grand Rapids, Mich.*

Advanced Engineering

Processing equipment for solvent extraction, water conditioning, sifting, and flaking is pictured in the food section of a 40-page annual review of engineering developments.—*Allis-Chalmers Mfg. Co., Box 512, Milwaukee, Wis.*

Can Cooler

An upward-inclined, rapidly moving belt which causes cans to spin while they move forward slowly under a spray of cooling water is delineated in a 4-page folder. The installation requires no operator.—*American Machinery Corp., Orlando, Fla.*

Hammer Mill

Designed specifically for custom grinding, and featuring quick and easy screen changes and 4-point reversible hammers, is the hammer mill detailed in Bulletin CG-948. Specifications and scale drawings are included in supplementary bulletin CGD-948. — *Sprout, Waldron & Co., Muncy, Pa.*

Steam Traps

Guidance for users of steam traps, including information on trapping theory, selecting the right size trap, installation, correct trapping practice for a variety of units, and maintenance are included in a new, profusely illustrated 36-page booklet.—*V. D. Anderson Co., 1935 W. 96 St., Cleveland 2, Ohio.*

Air Compressors

Based on normal applications handling air with atmospheric intake pressure, new chart simplifies selection of proper size water-cooled compressor for industrial use.—*Worthington Pump & Machinery Corp., Harrison, N. J.*

Milk Tanks

Stainless automatic weigh tanks which eliminate reweighing of milk and watching of scale dial, also splash-proof elliptical receiving tanks, are detailed in 12-page Bulletin 817.—*Rice & Adams Corp., Buffalo 17, N. Y.*

Rectangular Magnets

For prevention of tramp iron damage to equipment, and protection against fire, explosions and product contamination, 12-page Catalog 301-A describes triple pole high intensity rectangular magnets. Bulletin illustrates the use of various types, such as suspended, spout, and plate.—*Dings Magnetic Separator Co., Milwaukee, Wis.*

Transmission Belts

Procedure for designing drives using the company's multi-V belts is one of features of newly released Catalog Section 2170. The problems are outlined, step-by-step methods given, and solutions revealed. The section pictures and describes construction of the belts. —*The B. F. Goodrich Co., Akron, Ohio.*

Welding Equipment

Directed to firms and individuals who use the arc welding process in maintenance or repair of equipment, 12-page catalog, "Tweco-log No. 7," illustrates complete line of electrode holders, round clamps, cable and terminal connectors and cable splicers. Parts information is included, also data on maintenance and care of electric welding cables, connection, grounds, and holders.—*Tweco Products Co., English at Ida, Wichita 1, Kan.*

Bag Closing

Complete information about sewing heads, columns, tables, conveyors and accessories for closing filled paper and textile bags is given in tables and illustrations in Bulletin 200. Stitch types and variety of closures are explained.—*Union Special Machine Co., 400 N. Franklin St., Chicago.*

Materials Handling

Pneumatic Conveyor

Corn, peas, beans, nuts, and the like, are handled without breakage in the enclosed, self cleaning pneumatic conveyor unit described in 4-page folder. Also featured is pneumatic sorter that cleans and separates products by weight.—*Electric Sorting Machine Co., 410 44 St. S.W., Grand Rapids, Mich.*

Container Conveyor

Rotary accumulating and unscrambling tables and straight-line unscrambling tables, in addition to bottle, jar and can chain conveyors, are pictured and detailed with specifications in Bulletin F-26.—*Island Equipment Corp., 101 Park Ave., New York City.*

Belt Conveyor

Rigidly constructed floor-to-floor and floor-to-ceiling inclined belt conveyors, as well as horizontal belt conveyors, are depicted on information sheet. — *Conveyor Specialty Co., North Quincy, Mass.*

Straddle Truck

Greater visibility for the operator and increased capacity (18,000 rather than 12,000 lb.) are improvements in straddle truck which are described and depicted in 16-page Catalog 1118.—*Hyster Co., 2902 Clackamas St., Portland 8, Ore.*

Trailers

Industrial trailers designed for use in trackless train system are described and illustrated in 16-page Catalog A-999. Specifications are given and applications shown.—*Mercury Mfg. Co., 4030 So. Halsted St., Chicago 9.*

Belt Conveyors

Latest addition to Rapistan line of material handling equipment is the Power-Veyor, described and pictured in 4-page bulletin. Included in presentation is panel showing various types of motors available to power this unit, a description of type of belt used, information on pulleys and bearings, and numerous illustrative drawings.—*The Rapids-Standard Co., Inc., Grand Rapids, Mich.*

Lift Trucks

Walk-along lightweight lift trucks feature all controls at end of handle, and safety by dynamic braking and a "deadman" disk brake. Bulletin 166 covers high and low lift fork, straddle, and platform type trucks, and standard dimension diagrams are included.—*Revolvator Co., North Bergen, N. J.*

Dumpers

Free flowing materials, including liquids, in loads up to 500 lb. are lifted and dumped by hoist units of various types, which are illustrated in action on single sheet circular.—*Colson Equipment & Supply Co., 1317 Willow St., Los Angeles, 13.*

Electric Lift Trucks

Two-stage hydraulic lifting by means of the "ram-within-a-ram" principle, sit-down truck operation, and low mast heights with high free-lifts are features of electric trucks detailed in Bulletin 5151.—*The Yale & Towne Mfg. Co., Philadelphia, 15.*

Flexible Conveyor

Constructed of steel angle and steel pipe with heavy casters, 4-way portable conveyor is illustrated in folder in use inside produce warehouses, also onto truck beds and into ends of box cars. Specifications and dimensional drawings are included.—*H. W. Creager Mfg. Co., Arvada, Col.*

Steel Strapping

Reduction of shipping costs and diminution of damage with use of steel strapping are recounted in case histories in 32-page book. Barbed box straps, sealers, stretchers and accessories are pictured with specifications.—*Strapping Division, Acme Steel Co., 2840 Archer Ave., Chicago 8.*

Control Equipment

Boiler Draft Gages

Use of diaphragm-operated unit in Multi-Pointer gages for measurement of pressure, draft or differential is explained, and some of standard ranges available are listed, in Bulletin 163-B. Four styles of casings in sizes to accommodate 1 to 12 units are depicted.—*Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10.*

Flame Failure Safeguard

Semi-automatic and manually ignited industrial oil burners are protected against flame failure by new photoelectric scanner described in information sheet designated CH4751.—*Combustion Control Corp., 77 Broadway, Cambridge 42, Mass.*

Retort Control

Fully automatic retort control, in processing in water under pressure or in steam with cooling under pressure, is described in 4-page folder. The canning process timer can be added

(Catalogs, Bulletins Continued)

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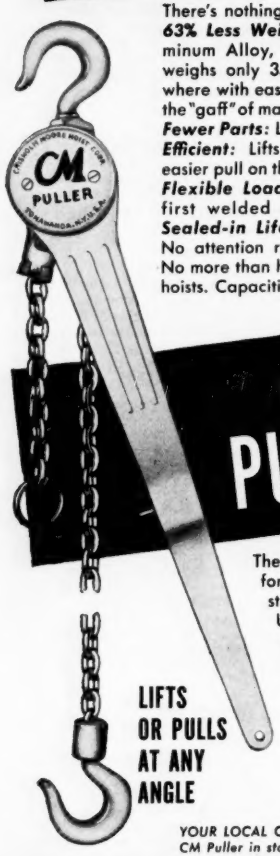
LIGHT WEIGHT — HEAVY DUTY

High Speed CHAIN HOIST

There's nothing to compare with it! ***63% Less Weight:*** Of Alcoa Aluminum Alloy, the 1 ton capacity weighs only 35 lbs. Carry it anywhere with ease. Designed to stand the "gaff" of maintenance work. ***42% Fewer Parts:*** Long service life. ***96% Efficient:*** Lifts loads rapidly with easier pull on the chain. ***Herc-Alloy Flexible Load Chain:*** America's first welded alloy steel chain. ***Sealed-in Lifetime Lubrication:*** No attention required. ***Low Cost:*** No more than heavy old style chain hoists. Capacities: ¼ to 10 tons.



CM PULLER

The tool of a thousand uses for lifting, pulling, skidding, stretching, straightening. Use it vertically, horizontally, diagonally... any angle. Eliminates the dangers of makeshift methods. Holds the load where you leave it. Compact, light weight... the ¾ ton capacity model weighs only 13 pounds. Herc-Alloy flexible load chain. Labor saved more than repays initial low cost. Capacities: ¾, 1½, 3 and 6 tons.

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to any semi-automatic, air-operated system to make it fully automatic.—*C. J. Tagliabue Mfg. Co., Park & Nostrand Aves., Brooklyn, N. Y.*

Dial Scales

Long-life tape-driven mechanism, instead of rack and pinion movement, is reported to give greater sensitivity and accuracy to variety of dial scales pictured with specifications in 8-page fo'dout, No. 666.—*The Howe Scale Co., Rutland, Vt.*

Flow Meters

Picture story of flow meter manufacture and testing is subject of 8-page Booklet 800.—*Penn Industrial Instrument Corp., 3116 N. 17 St., Philadelphia, 32.*

Electronic Counters

The electronic counting principle, methods of count detection, and typical applications are included in 4-page guide to complete line of electronic counters, scalers, counter chronographs, and special electronic frequency measuring and computing equipment.—*Potter Instrument Co., Inc., 136-56 Roosevelt Ave., Flushing, N. Y.*

Plant Supplies

Industrial Paint

Resistance to fumes, mildew, moisture, and dirt are reported features of Millwite heavy semi-paste paint, announced in circular. Formulated with titanium dioxide for hiding and coverage powers, it can be applied to any surface with brush or spray.—*Stonhard Co., 500 Stonhard Bldg., 1306 Spring Garden St., Philadelphia 23.*

Sanitation Aids

Cleaners, detergents, bactericides, and sanitation chemicals for dairies and food processing and packing plants are described in pocket-size booklet. Positive-displacement feeder for delivering measured quantity of detergent solution to point of use is pictured. Supplementary bulletin deals with plant sanitation methods.—*Klenzade Products, Inc., Beloit, Wis.*

Flavorings and Ingredients

Included in 28-page wholesale list are suggestions for use of flavoring, aromatic and essential oil materials.—*Florasynth Laboratories, Inc., 1513 Olmstead Ave, New York City.*

Heat Sealing

Dry labeling, taping, and wrapping with heat rather than water-moistenable adhesives comprises subject matter of 26-page technical manual, now in its 3rd edition. Thermoplastic adhesives of tack-retaining pressure-sensitive type, and quick-bonding type activated and applied under combined heat and pressure, are described. They are coated on variety of papers for many applications.—*Nashua Gummed & Coated Paper Co., Nashua, N. H.*

Dairy Plant Handbook

Cleaning, sanitizing, and insect control, also handy tables for alkalinity and causticity determinations, conversion formulas, and common equivalents, are included in 36-page booklet. —*Tykor Products, Inc., 350 Madison Ave., New York City, 17.*

Insulation

The role of insulation in saving heat in hot water equipment; a railroad refrigerator car equipped with built-in blast-freezer; tomato storage and ripening; and piping of hot vis-

(Catalogs, Bulletins Continued)

NUTRITION COUNTS AT THE COUNTER

. . . and Pfizer products add nutrition value to many foods

"Is it enriched?" "Does it have vitamins?" This is the kind of question that more and more nutrition-conscious housewives are asking when they go to market.

Chas. Pfizer & Co., Inc., with its more than a hundred chemicals, helps many a food manufacturer, many a processor, many a storekeeper to give customers the answers they want.

Here are four instances among many which could be cited . . . baker's bread made with Pfizer Enrichment Wafers . . . flour for home-baked bread enriched with Pfizer Bi-Cap® combining thiamin, riboflavin, niacin and iron. Fruit jams, jellies and beverages benefiting from the even acidulation assured by Pfizer Citric Acid or Pfizer Tartaric Acid in the case of grape flavors . . . baking powders of controlled high quality with leavening action assured by Pfizer Cream of Tartar as the acid ingredient.

For prices and further information on each of these chemicals, write Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6, N. Y.; 211 E. North Water Street, Chicago 11, Ill.; 605 Third St., San Francisco 7, Calif.

PFIZER

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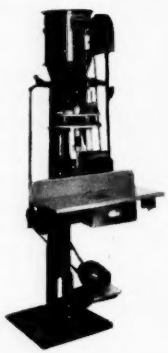
Modern Triangle Package Machinery Will Relieve the Pressure

THERE IS more than one manufacturer having a tight squeeze. Perhaps he, like 3 out of 4, has overlooked the opportunity for modernizing an antiquated packaging department that is robbing him of profits. Triangle owners regularly report savings of 25% and more in packaging costs.

FOR EXAMPLE: The simple Triangle Model SPA Volumetric Filler illustrated is credited with $60 per month labor saving for a dessert manufacturer. Fast and accurate, this one-operator machine will accurately fill packages with semi-free and free flowing material at a rate up to 60 per minute. Filling and discharging is fully automatic. For high speed, fully automatic production it is available in multiple units with synchronized conveyors. This is one of many Triangle machines for weighing, filling or carton sealing of dry materials.



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cous fluids are discussed in separate articles in *Insulator*, Vol. 18, No. 5.—*Armstrong Cork Co., Lancaster, Pa.*

Silicone Fluids

Properties and behavior of DC 200 Silicone Fluids and their usefulness as damping and hydraulic media, liquid dielectrics and special purpose lubricants are presented in 32-page book.—*Dow Corning Corp., Midland, Mich.*

Detergent

Facilitating of car and truck washing by Emcol 4150, non-alkaline detergent concentrate, is featured in Technical Bulletin No. 21. Product is termed harmless to finishes and user.—*Emulsol Corp., 59 E. Madison St., Chicago.*

Milk Crates

Reduction of operating costs with cases for round, square, and paper milk containers is subject of colorful 4-page folder.—*Baker Box, Inc., Worcester 8, Mass.*

Antioxidant

Physical and chemical characteristics of N.D.G.A. antioxidant, and functions of antioxidants, are detailed in 4-page folder.—*Nordigard Corp., Chicago 12.*

Miscellaneous

Steels

Stainless and heat resisting steels, tool and die steels, and cast-to-shape steels are covered, with typical analysis and applications for each brand, in 16-page booklet.—*Jessup Steel Co., Washington, Pa.*

Box Classification Indicator

Available to users of corrugated boxes is a simplified classification indicator, which tells at a glance the corrugated box recommended for safe packing and shipment of articles in various weights and sizes.—*The Hinde & Dauch Paper Co., Sandusky, Ohio.*

Electrical Outlets

For use wherever additional electrical outlets are required, Multi-Outlet strip, described in Bulletin 140-II-49, provides six outlets on thin metal case.—*Eberbach & Son Co., Ann Arbor, Mich.*

Laboratory Equipment

Projection and dial reading analytical balances, laboratory ovens, centrifuges, pH meters, heating mantles, and a hand homogenizer are among units described in equipment catalog designated L03-49.—*Schaar & Co., 754 W. Lexington St., Chicago 7.*

Laboratory Glassware

Pyrex, Vycor and Corning brand laboratory glassware, new items, and price revisions are covered in 72-page Supplement A to Catalog LP 28. New items are described and illustrated.—*Corning Glass Works, Corning, N. Y.*

Packings for Chemicals

Intended to give a complete picture of packing requirements for parctically all chemical applications is a new booklet entitled "Packing for the Chemical Industry." Each style is fully explained and illustrated, and recommendations are made for specific services and temperatures. Special feature of booklet is a section devoted to Chemlon, a new development in chemically inert packings.—*Crane Packing Co., 836 S. Michigan Ave., Chicago.*

—*End*

GMC trucks are offered in types for every food transport job . . . from pickup, panel and special delivery models to powerful gasoline and Diesel trucks and truck-tractors in all sizes and capacities.

The weekly "bread bakin'" of Grandma's time is but a pleasant memory to many city-dwelling families. Now, each day, motor trucks bring fresh, golden-crusted loaves to retail stores and kitchen doors from gleaming ovens miles away.

A large western bakery does a superb job of this kind. It operates a fleet of GMC-powered semi-trailers, each specially insulated and heated to keep 12,500 loaves oven-fresh on journeys to sub-stations 100 miles from its plant. From sub-stations, another fleet of special GMC door-to-door delivery units makes speedy local distribution.

Keystone of this operation is *transport dependability* . . . and GMCs provide it, as they do for every type of hauling job.

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GASOLINE · DIESEL

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your container source
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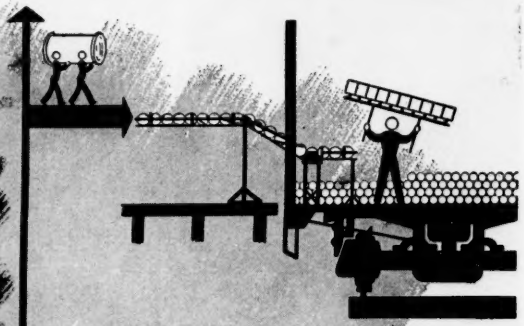
and **SERVICE**



Ample Supply — always enough containers, as proved by the satisfaction of our many customers during even the lean supply years of the war.

Prompt Delivery — a policy conformed to during National Can's history of nearly 50 years of container manufacture . . . a record for making deliveries when needed — where needed.

Experienced Service — a choice of available services — technical, mechanical, or lithographic — for the food packer or the general container user. And at your command is our fund of production ideas, selectively gathered through the years, constantly re-examined, tested and renewed.

Well-rounded service and dependable supply are only a part of the bonus values you get with National Can metal containers that are made to rigid standards of accuracy and high quality. Check these advantages and learn how they may help you by calling our nearest sales office or plant.

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New Technology

VITAMINS

Ascorbic Acid Losses Retarded by Sugars

Oxidation of ascorbic acid in the presence of copper and iron is reduced by the addition of sugar and an increase in pH. Rate of oxidation in acid solutions is directly proportional to the square root of the Cu and varies inversely with the square root of the hydrogen ion concentration. Ferric ions catalyze the oxidation slightly in acid solutions, but apparently inhibit Cu catalysis at pH values near neutrality. Protective effect of sugars is greatest with levulose, decreasing with maltose, sucrose, dextrose and lactose, respectively.

Digest from "Effect of Sugars on Oxidation of Ascorbic Acid," by M. A. Joslyn and J. Miller, presented before ACS meeting, San Francisco, Calif., March 29, 1949.

Amino Acids in Fish Meals

Fish meals, prepared by reduction of whole fish such as herring and pilchard, or from offal discarded during canning or filleting operations, are very good sources of essential amino acids. Stick-waters, condensed fish solubles, and waste waters, are excellent sources of many of the water-soluble B vitamins. Herring and white spring salmon eggs, milts of herring, white spring and chum salmon, when compared with fish meals, are low in essential amino acids.

These are results obtained from a survey of the distribution of essential amino acids in fish products, using microbiological assay methods. Shown in table form are the percentages of the essential amino acids in the above mentioned products.

Digest from "Amino Acids in Fishery Products. II," by C. P. Deas, P. W. Ney and H. L. A. Tarr, *Progress Reports of the Pacific Coast Stations*, No. 77, Vancouver, B. C. 97-99, Dec. 1948.

FATS AND OILS

Stabilizing Edible Fats

Inhibiting rancidity of animal, vegetable, or fish oils, fats and waxes, and removal of metals such as the catalysts employed in hydrogenation or those derived from container corrosion, are the objects of a recent invention.

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The process comprises heating the fat with a beta-mercaptopropionic compound which precipitates the metal and inhibits rancidity. The precipitated metal is then removed by filtration.

Digest from U. S. Patent 2,457,227, issued Dec. 28, 1948, on an application dated Dec. 27, 1945, to M. F. Gribbins, Wilmington, Del., and assigned to E. I. du Pont de Nemours & Co.

Color of Cottonseed Oil

Oils from cottonseed meats cooked at low temperatures revert less rapidly than those from meats cooked at high temperatures. This applies regardless of the method of cooking dry or wet.

Experiments were conducted to determine the effects of (a) cooking cottonseed meats under laboratory conditions, and (b) cooking the meats and expressing the oil on a mill-scale. Conditions were varied with respect to preparation of meats, addition of water before cooking, and temperature and duration of cooking.

Laboratory experiments showed that the addition of 10 percent water to the flaked meats prior to cooking at 235-244 deg F. for 1½ hr., resulted in low bleach color in the expressed oils. It was found that, as the amount of water added prior to cooking decreased, the gossypol in the cooked meats decreased. However, the amount present in the expressed oils remained almost constant.

In the first series of mill-scale experiments it was found that cooking in 11 percent water did not improve the bleach color of the freshly expressed screw-pressed oils. The oil reverted much less rapidly than oils from meats dry-cooked at high temperatures. In the second series of mill-scale experiments, using both hydraulic and continuous screw press methods, it was found that temperatures during cooking had an appreciable effect on the freshly expressed oils. Samples of oil from seed cooked at high temperatures (both wet and dry) contained less gossypol and were of higher initial bleach color than the oils from seed cooked at low temperatures.

Digest from "Processing of Cottonseed. IV. Effect of Preparation and Cooking of Meats on the Bleach Color and Storage Properties of Screw-Pressed Oils," by P. A. Williams, R. P. Hadden, C. M. Hall, L. E. Castillon, W. A. Guice, R. T. O'Connor and C. H. Boatner, *The Journal of the American Oil Chemists' Society*, 28-34, Jan. 1949.

Improved Lard Process

Production of lard by an improved alkali rendering process is described in a recent patent. The ground fat is intimately mixed with warm aqueous alkali solution, and heated with agitation to 176-203 deg. F. for 30-60 min. Melted fat is then separated from the aqueous phase by gravity settling and centrifugation. It is washed with salt water and hot water until free from traces of soap or free alkali. Separation of fat from wash water after each treatment is by a centrifuge.

Digest from U. S. Patent 2,456,684, issued Dec. 21, 1948, on an application dated Jan. 31, 1944, to F. E. Deatherage, Cincinnati, O., and assigned to The Kroger Grocery & Baking Co.

CONFECTIONERY

Preventing Chocolate Bloom

Treating chocolate, cocoa butter and similar chocolate products to inhibit the formation of fat and sugar bloom due to extreme summer temperatures or humid atmospheres, is one of the objects of a recent patent.

The process comprises isomerizing part of the cocoa butter or other fat, with nitrous acid as a catalyst, at a temperature of 50-104 F., in the presence of a liquid organic fat solvent which is inert to the acid. The catalyst

(New Technology Continued)

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is produced by dissolving or dispersing an aqueous nitrous acid solution in a water-miscible organic fat solvent. The fat to be isomerized is dissolved in a suitable solvent at 59-68 F. The fat solution is then brought into contact with the catalyst mixture. When conversion is completed, the solid fat is removed from the surface of the mass and the solvent recovered.

Digest from U. S. Patent 2,456,691, issued Dec. 21, 1948, on an application dated Jan. 27, 1948, to Wm. E. Eipper, Philadelphia, Pa.

STORAGE

Frozen Storage of Pork

That frozen pork stored at −10 to −20 F. retains its palatability better than that stored at higher temperatures, was one of the findings resulting from a study undertaken to determine the effect of different storage temperatures upon rancidity development in fat. Samples were wrapped in moisture-vapor-proof cellophane, then in waxed freezer locker paper, and frozen at −35 F. After 22 hr., they were transferred to −10, 0, or +10 F. storage and held 12, 24, 40, 56, or 72 weeks.

Serious freezer burn and excessive discoloration of fat were not observed at −10 or lower. Loss of weight was negligible. After 40 weeks storage, cooking losses were slightly greater for pork stored at −10 than for fresh, unfrozen pork. Vitamin retention was high in the frozen samples.

Digest from "Keep The Temperature Low When Storing Pork," by J. L. Hall, J. Kalen, B. D. Westerman, D. L. Mackintosh and G. E. Vail, *Refrigeration Engineering*, 247-50, March 1949.

Vitamins In Canned Foods

Storage conditions influence color, flavor, aroma, texture and vitamin content of canned foods. Of the vitamins, ascorbic acid and thiamin are affected to the greatest extent. During the first month, when oxygen in the can is consumed, ascorbic acid retention may be influenced by the type of product, amount of oxygen and type of container. Beyond this period, temperature is the most important factor. At 100-110 F., destruction of ascorbic acid and thiamin proceeds at a measurable rate. At 70 F., retention of these vitamins appears to be 70-90 percent. Carotene, vitamin D, niacin, riboflavin and pantothenic acid retentions are reported to be higher.

At temperatures of 70 or lower, storage of most canned foods for 1 yr. does not appear to have any marked influence on quality. Freezing has an adverse effect on the texture of some

canned vegetables but does not affect the utilization of these products.

Digest from "Effect of Storage on Vitamins and Quality in Canned Foods," by J. F. Feaster, M. D. Tompkins and W. E. Pearce, *Food Research*, 25-39, Jan.-Feb. 1949.

DAIRY

Powdered Milk Solubility

Spray-dried whole milk powder's solubility is affected by the degree of precondensing and, to a lesser extent, by temperature of preheating.

Solubility determinations were made on spray-dried whole milk powders from milk precondensed to 20 and 40 percent total solids. In every comparison, the powder made from 40 percent total solids concentrate had a higher initial solubility, and maintained a higher solubility during storage, for periods up to 6 months, than did the powder made from 20 percent concentrate.

Preheating temperatures of 160 deg. F. for 30 min., 170 deg. for 10 and 30 min., and 180 deg. for 10 min. were used. Initial solubility of the powder made from milk preheated to 160 deg. was slightly lower than that of the other powders. Solubility of the 180 deg. powder decreased rapidly when stored at 100 deg. F. The other powders retained practically their initial solubilities during storage. Homogenization at higher concentrations also improved solubility of the resulting powder. Density of the powders made from 40 percent total solids concentrate was greater than density of powders from the lower solids milk.

Digest from "The Keeping Quality, Solubility, and Density of Powdered Whole Milk in Relation to Some Variations in the Manufacturing Process, II Solubility and Density," by L. J. Manus and U. S. Ashworth, *Journal of Dairy Science*, 935-45, Nov. 1948.

Stabilizing Homogenized Milk

Addition of sodium citrate with ascorbic acid to homogenized milk to be frozen and stored, retards milk solids separation upon thawing, and off-flavor development. Ascorbic acid alone, does not prevent separation upon thawing, although it does help preserve the flavor.

Experiments were conducted to determine the ability of certain chemicals to act as stabilizers and increase the storage-life of frozen homogenized milk. Chemicals used and their concentrations per liter of homogenized milk were: ascorbic acid 0.1g.; pectin 1g.; calcium chloride 0.5g.; urea 3g.; carboxy methyl cellulose 0.5g.; sodium citrate 2g.; disodium phosphate 1g.; 30 percent hydrogen peroxide 1ml.;

(New Technology Continued)

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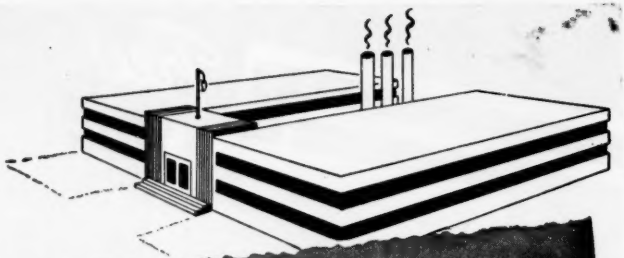

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and sodium citrate 2g. with ascorbic acid 0.1g. Samples were subdivided, frozen at 0 deg. F., and stored at +11; 0, and −17.5 deg. They were removed from storage at 10 day intervals and thawed for examination.

Separation of milk solids was not noticeable in the samples containing sodium citrate until they had been stored 145 days. Flavor deterioration was evident after 105 days. Noticeable separation and flavor deterioration in the untreated controls were evident after 65 days.

Addition of ascorbic acid with the sodium citrate doubled time before flavor deterioration as against the control samples. This combination also prolonged the time that homogenized milk could be kept when frozen at one temperature and subsequently stored at a higher temperature.

The other chemicals had very little, if any, effect upon separation or flavor loss.

Digest from "Frozen Homogenized Milk VI. The Use of Stabilizers in Frozen Homogenized Milk," by C. J. Babcock, J. N. Stabile, E. S. Windham and R. Randall, *Journal of Dairy Science*, 175-82, Feb. 1949.

ENGINEERING

Compacting Foods

Vibration as a means of compacting pastes and granular materials, has been investigated in the Dept. of Civil and Municipal Engineering, University College, London. Vegetable puree could be deaerated and compacted effectively at frequencies of 60-100 cycles/sec. Meat pastes were practically unaffected at 100 cycles. They required frequencies in excess of 130-150 cycles, and greatly improved compaction was obtained at 200 cycles/sec. From these results it was assumed that it is not the work done on the substance but the rate of doing the work that is important.

Digest from "Compacting By Vibration," by D. A. Stewart, *Food Processing, Packing, Marketing*, 57, Feb. 1949.

Cake Ice by Extrusion

White ice, suitable for railway and truck icing, fisheries, dairies and beverage dispensers, is produced 30 times faster by a newly developed continuous process than in comparable can-ice plants. In this process, direct expansion freezing cylinders extrude hard white ice in columns suitable for automatic severing into cakes. Ice is formed at the rate of 10 lb. per sq. ft. of freezing surface per hr. at 5 deg. F. suction temperature. These results have been obtained in a 1-ton pilot

plant which was developed at the University of Texas.

The machine has a tapered inner cylinder which extrudes an ice column 12 x 15 in. The inner cylinder, which is welded to the refrigerant jacket, provides a net freezing surface of 8.65 sq. ft. Below the jacket is a precooling chamber, refrigerated both by conduction and by suction from the evaporator. Water enters the machine through a float valve and is precooled to about 40 deg. F. before reaching the reservoir in the top extension of the jacket. The only moving part is a square ram operated by a hydraulic cylinder below the precooler.

Digest from "Extrusion Process Generates Continuous Ice Cake," by John R. Watt, *Refrigerating Engineering*, 34-36, 84, Jan. 1949.

MEATS AND FISH

Spoilage of Fish

Flesh and body fluids of freshly-caught fish are sterile, but the external surfaces and alimentary canal may be heavily infected with aerobic spoilage organisms. Though their optimal temperature is 50-68 deg. F. these marine spoilage bacteria are psychrophilic and will multiply down to 32 deg. F. or even below. With some forms the optimal increase occurs at 41 deg. F., so that fish that are chilled may ultimately have as large a bacterial population as unchilled fish, but after a longer time.

As in meat, the onset of bacterial spoilage of fish is influenced by the pH of the flesh, which is in turn determined by the glycogen available for lactic acid formation at the time of death. Most fish are caught after a violent struggle in nets or on lines, so that the glycogen content of their muscles is low, rarely exceeding 0.2 percent. In haddock or fish that are caught without struggling, the glycogen content is higher and ultimate pH of the flesh is lower. These fish keep somewhat better also. The lesser amount of lactic acid formed in most commercial fishes and the higher pH of the flesh, 6.2-6.6 compared to 5.5-6.0 in meat animals, are undoubtedly factors in their more rapid spoilage even at chilling temperatures.

All marine fishes contain trimethylamine oxide which is reduced to trimethylamine by reducing bacteria during spoilage. Dimethylamine is also formed in some fish but not in all. Ammonia production accompanies proteolysis in spoilage, but is evident only when general bacterial growth is well established.

Because of the psychrophilic growth of the marine bacteria, spoilage of fish can occur even when they are

(New Technology Continued)

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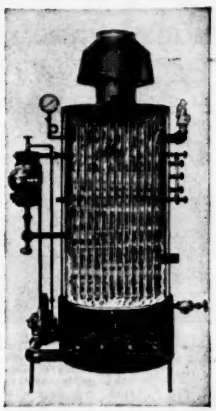

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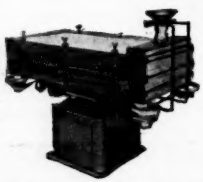

(Above) Schutz-O'Neil Style "D" Pulverizer, for fine grinding of dry, non-gritty stocks. Made in 6 sizes with capacities up to 2000 lbs. per hour.

(Left) The Schutz-O'Neill Gyrator Sifter turns out a large volume of uniform, clean product. 1 to 3 sieve frames for single or multiple separation.

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packed in crushed ice. Thus, haddock begin to show the first sign of spoilage between the 7th and 11th days when packed in ice. In 15 days they are definitely stale and deteriorating. Cod and larger fish keep somewhat longer than haddock. For this reason, simple chilling with ice is not satisfactory for fishing voyages of more than a week, if fish are to be landed in strictly "fresh" condition. Freezing is the most satisfactory preserving method for voyages of 3 to 4 weeks or more.

Digest from "The Spoilage of Fresh Fish and Its Control," by Geo. A. Reay, *Chemistry and Industry*, 35-9, Jan. 15, 1949.

PACKAGING

Packing Menhaden

Preparing and packaging menhaden to be marketed as human food is the basis for a recent patent. Dominating step in the process is subjecting cut portions of the fish to an abrupt temperature drop, which loosens the skin and scales, making possible their easy removal.

The method comprises washing in boiling water and raising the temperature of cut portions of menhaden to approximately 212 deg. F., then violently cooling the fish to approximately 50 deg. F. and vigorously agitating in water at this temperature. Fleshy portions are reported to separate from the skin, scales and oil. These portions are ground, filled into cans, vacuum packed and sterilized.

Digest from U. S. Patent 2,453,625, issued Nov. 9, 1948, on an application dated May 18, 1944, to Geo. T. Harrison, Tilghman, Md.

MISCELLANEOUS

Imitation Maple Flavor

According to recent patent specifications, an artificial flavoring material of true maple character can be produced by the reaction of certain alpha amino acids of 3-6 carbon atoms with a reducing saccharide within the temperature range of 212-338 deg. F.

Among the compounds having the necessary structural formula, those most effective in producing intensity and veracity of maple flavor are serine, threonine, alpha-methyl-alpha-amino-n-butyric acid, alpha-amino isobutyric acid, and alpha-amino-n-butyric acid, the latter being preferred at present. The reducing saccharide is one capable of reducing Fehling's solution to yield cuprous oxide, and the reaction is carried out in such a manner as to effect a substantially anhydrous state of the

mixture, at least in the later stages of the reaction.

It is believed that the development of maple flavor depends on a high degree of molecular contact between the reactants, and that water must not be present to such an extent as to preclude a substantially anhydrous molten state at the end of the reaction. The temperature range is determined on the one hand by the incidence of maple development, and on the other by excessive caramelization. The exact nature of the chemical reactions in the process is obscure, and the particular compounds responsible for the maple flavor have not yet been identified. The product is completely soluble in water, and can be prepared in the form of a dry solid suitable for tableting or incorporation into dry food preparations.

Digest from U. S. Patent 2,446,478, issued Aug. 3, 1948, on an application dated Oct. 6, 1944, to Roland E. Kremers, Summit, N. J., and assigned to General Foods Corp., New York City.

Ion Exchange Retards Fruit Juice Spoilage

Ion exchange treatment of apple juice effects the removal, or partial removal, of nutrients necessary for the growth of microorganisms. Juices so treated become very much less liable to spoilage than untreated juices.

In preliminary experiments it was found that apple juices, subjected to ion exchange treatment and then freely exposed to air, showed less fermentation than juices not so treated. In the initial tests, samples of pasteurized juices were separately inoculated with a loopful of: (a) Pure wine yeast culture; (b) a suspension of the same yeast in glass-distilled water, and (c) a washed suspension of the mixed microflora obtained by centrifuging untreated juice, and incubated aerobically at 77 deg. F. No growth of (a) had occurred in the treated juice after 2 weeks' incubation. With (c) a small deposit was formed and the mixed yeasts found in it had not the healthy appearance of those growing in the untreated juice.

In a final test, treated and untreated juices were stored at ordinary temperatures in the laboratory. These juices were not pasteurized and no aseptic precautions were taken, yet the treated juices showed no obvious fermentation during 4 weeks, although a slight mold growth occurred. Juice which had been deaerated and bottled in CO_2 showed even greater stability. Untreated juice was fermenting rapidly within 3 days.

Digest from "Effect of Ion-Exchange Treatment on the Stability of Apple Juice," by S. W. Challinor, M. E. Kieser and A. Pollard, *Nature*, 1023-25, June 26, 1948.

—*End*

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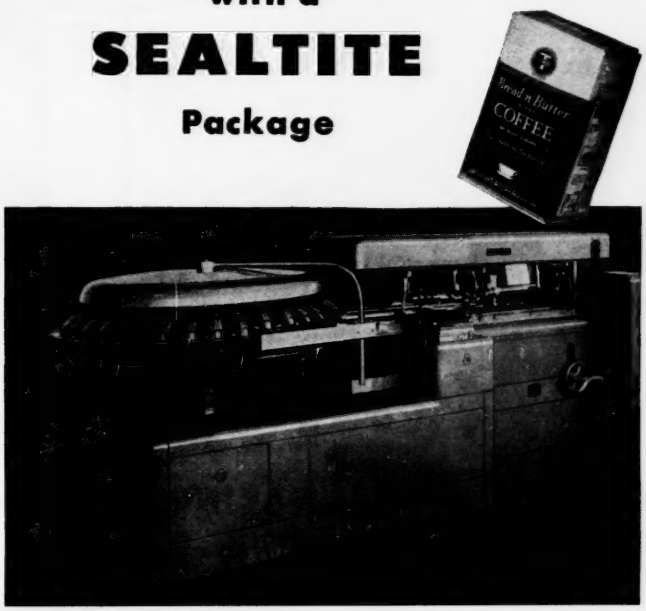

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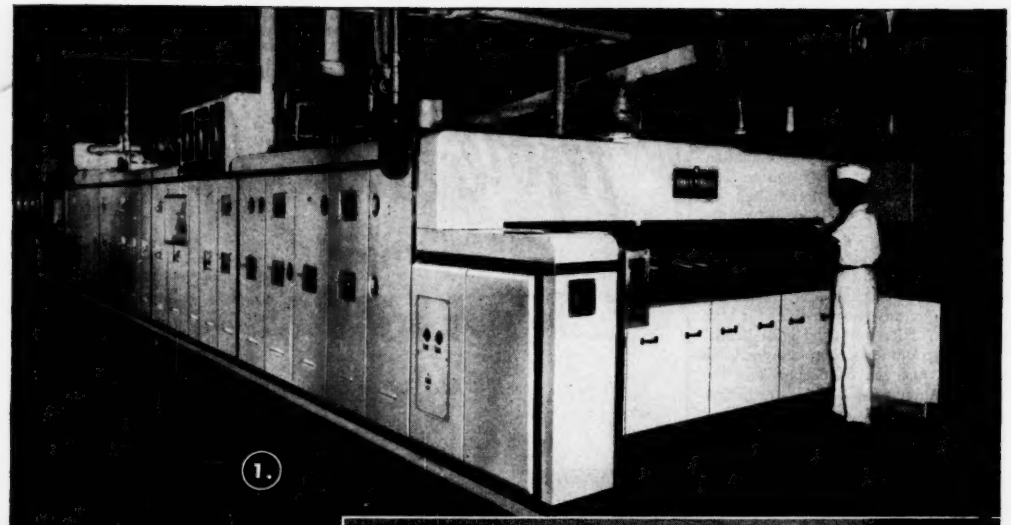

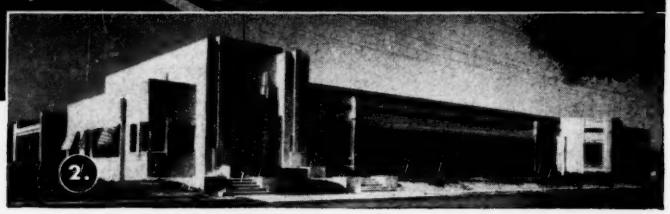

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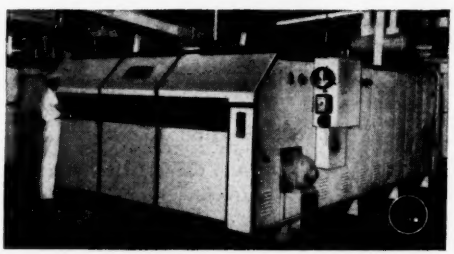

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Books

Lactic Acid Process

THE CHEMICAL PRODUCTION OF LACTIC ACID FROM SUGARS. *By Rex Montgomery. Published by Sugar Research Foundation, Inc., 52 Wall St., New York 5, N. Y., 1949. 28 pages; 6x9 in.; paper. Free.*

Recent research at Birmingham University and also widely scattered observations, all bearing on the formation of lactic acid from sugars by purely chemical means, are reported in this most recent publication of the Sugar Research Foundation.

The work at Birmingham was undertaken to determine conditions necessary for the maximum production of lactic acid from the action of alkaline reagents. The book also discusses the question of the efficiency of the chemical method as opposed to the present fermentation process.

Identification

TRADE MARKS. *By H. Bennett. Published by Chemical Publishing Co., 26 Court St., Brooklyn 2, N. Y.,* 1949. *479 pages;* 5¾x8½ *in.; cloth. Price,* $10.

Because so many food products do not rely upon distinctive names for their sales appeal, a book on trade names and trade marks may seem rather far afield. A cursory perusal of any grocery shelf, however, reveals that the industry is well acquainted with the value of eye catching names.

This book outlines the legal aspects of trade marks and names, offers methods to select attractive and suitable names, and indexes both names and marks—and their owners—now in use. For any food producer interested in this aspect of merchandising, the book is well worth the rather high price.

Food Fundamentals

INTRODUCTORY FOODS. *By Osee Hughes. Published by The Macmillan Co.,* 60 *Fifth Ave., New York.,* 1949. *575 pages;* 5¾x8½ *in.; cloth. Price,* $4.25.

Primarily a text book for beginners in college food courses, this revised edition could be useful in any food processing plant. It offers a basic study that will not be over the heads of those lacking a background in chemistry. At the same time, the author avoids the type of oversimplification that so often dissipates interest.

An excellent introductory chapter discusses the specific nutrients of foods. The foods themselves, are taken up according to their categories and are described as to function, preparation and preservation.

More on Oils

THE ESSENTIAL OILS, VOL. TWO. *By Ernest Guenther and Darrell Althausen. Published by D. Van Nostrand Co., Inc.,* 250 *Fourth Ave., New York, N. Y.,* 1949. 852 *pages;* 6¼x9¼ *in.; cloth. Price,* $10.

Data on the more important natural constituents of essential oils have been assembled in this second volume of a comprehensive series on essential oils. These data should relieve the research worker in the field of much of his present burdensome searches through the literature.

The work describes the structural formulas, occurrence, methods of isolation and identification, and physiochemical properties of several hundred compounds. Both old and new data are presented where they appear to be reliable and important. A limited number of synthetic products, structurally related to certain natural isolates that are of interest to the essential oil chemist, have also been added.

The first volume, published about a year ago, dealt with the production of these oils and described processes in use throughout the world. Succeeding volumes will discuss individual essential oils and their chemical composition.

Refrigeration Directory

PUBLIC REFRIGERATED WAREHOUSES—1949-50. *Published by National Association of Refrigerated Warehouses, Inc., 608 Tower Bldg., Washington 5, D. C. 124 pages; 6x9 in.; paper. Free.*

Complete listings of the services and facilities of some 450 public refrigerated warehouses, throughout the U. S., are made available in this directory. It tabulates suppliers to the perishable food and refrigeration industries.

The book is available without charge only to companies actually engaged in the production, processing, transportation, storage and marketing of perishable foods.

Government Publications

CROP PRODUCTION DATA. *Agricultural Economic and Statistical Publications. Bureau of Agricultural Economics. A bibliography of Bureau documents.* Comprehensive review of commercial crop production. Information from

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three mimeographed reports of Bureau of Agricultural Economics: 1. Annual Summary 1948 of Acreage, Yield and Production of Principal Crops by States, 2. Annual Summary 1948 for Commercial Truck Crops for Fresh Market, and 3. Truck Crops for Commercial Processing. In each case, 1948 figures are given by states or regions.

INFORMATION FOR APPLICANTS FOR FEDERAL MEAT INSPECTION. *Unnumbered document by Federal Meat Inspection Service, Bureau of Animal Industry. Revised edition of Dec.* 1948. *Mimeographed.* Describes and diagrams equipment required for slaughtering, also other facilities.

DEFINITIONS AND STANDARDS FOR FOOD. *Food & Drug Administration, Food, Drug, and Cosmetic No.* 2, *Rev.* 1. This is a compilation of all the standards of identity and quality applicable to foods on October 30, 1948. Since few new standards or modifications had occurred during the subsequent four months, the compilation is essentially applicable as of March 1949. The material indicates requirements, limits, and labeling provisions applicable for chemical and vitamin additions to standardized foods.

COPYRIGHT LAW OF UNITED STATES OF AMERICA. *Library of Congress leaflet. Price* 15c. This in effect is a codification of the law as applicable to copyright practice, especially the Act of 1947 and subsequent amendments.

FLEXIBILITY OF OPERATION IN DAIRY MANUFACTURING PLANTS *By J. M. Cowden and H. C. Trelogan. Department of Agriculture, Circular No.* 799. Price 15c. An economic analysis of factors contributing to productivity of nearly ten thousand dairy products plants.

FOREIGN COMMERCE AND NAVIGATION OF THE UNITED STATES. Available in part for calendar year 1945. Volume I, covering U. S. import and export statistics, available at $3.75. Volume II when issued will include export transport statistics. Gives data by commodities and countries of origin or destination, permitting analysis of United States trade in raw materials and finished foods.

The above recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, *D. C. When no price is indicated the pamphlet is free and should be ordered from the bureau responsible for its issue.*

You can weigh the advantage

Cans are light.

Now, just weigh the advantages of this simple fact.

Their lightness often means lower shipping costs. But it also reduces trucking and shipping costs of the wholesaler and jobber.

The lightness of cans makes the journey from the back room to the display areas in a grocery store an easier one, too.

That's but one of the advantages which tips the scale in favor of metal containers.

AMERICAN CAN COMPANY

New York • Chicago • San Francisco

This trademark CANCO *is your assurance of quality containers. Look for it!*

FIVE OTHER WAYS CANS WORK FOR SALES AND PROFITS

1. **Cans are break-proof.**
2. **Cans protect contents against light, air, insects, and moisture.**
3. **Cans are *compact*—mean more storage and display space.**
4. **Cans are tamper-proof.**
5. **Cans are easy to open and dispose of.**

WORTHINGTON

REFRIGERATION REPORT

WORTHINGTON PUMP AND MACHINERY CORPORATION
HARRISON, NEW JERSEY

Specialists in air conditioning and refrigeration for more than 50 years

Motorship "Saipan", operated by Columbia River Packers Association as "freezer ship" for tuna fleet.

What To Take On A Fishing Trip

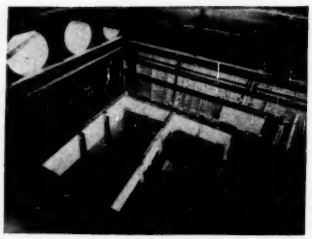
"Saipan" and "Tinian" are the memory-provoking names of two refrigeration vessels which are helping to revolutionize the tuna industry.

The idea is to relieve the fishing vessels of duty as carriers and permit them to concentrate on fishing. The "floating ice boxes" accompany the fleet and freeze the catch on the spot.

These carriers, operated by Columbia River Packers Association, are the largest engaged in this work.

Freezing is accomplished in a 75-ton capacity brine tank in which covered galvanized steel baskets, each containing 1250 lb of fish, are stacked. Brine is pumped through banks of ammonia coil. The coiling is especially heavy in order to provide effective cooling in tropical temperatures. 75 tons of tuna are frozen in 24 hours.

The refrigeration is provided by four 8" x 8" vertical Worthington Compressors, working through a single-stage compression system.



View of freezing tank, showing exceptionally heavy coiling.

We Keep It 40 Below By The Stillaguamish

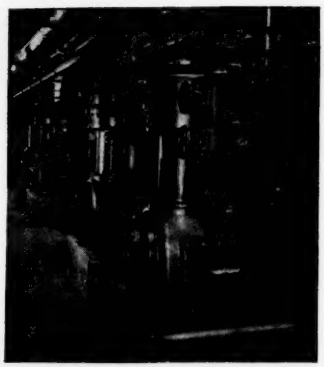
On the rich lowlands formed by the Stillaguamish River which runs by East Stanwood, Wash., is an immense acreage planted in strawberries, raspberries, peas and corn.

Here, in "the heart of the harvest", Pictsweet Foods Inc. built its quick-freezing plant, so as to preserve "peak of crop" freshness.

To service two large freezing tunnels, Pictsweet built a 1200 hp refrigeration compressor room, housing fifteen compressors. The temperature in these tunnels must be kept very low, so the compressors must maintain temperatures as low as -40 F.

It requires two stages to pump heat from this low temperature, and five Worthington 6HA6 Ammonia Booster Compressors are installed for the first step. These Worthington units pump the low pressure gas directly from the evaporator coils in the tunnels and compress it for the last stage units including Worthington 10 x 10 Vertical Ammonia Compressors.

Five Worthington Ammonia Booster Compressors used for quick-freezing.



Worthington Vertical Compressor at Quincy Market Cold Storage & Warehouse Co., Watertown, Mass.

30 Miles of Brine

The largest frozen food storage plant in New England—the plant operated by Quincy Market Cold Storage & Warehouse Co. — depends upon Worthington refrigeration equipment to maintain room temperature at minus 10F and a constantly high humidity.

Refrigeration for brine which travels through 165,000 ft of 2 in. pipe (roughly 30 miles), is supplied through four Worthington 10 x 10 vertical single-acting ammonia compressors, each driven by a 140 hp Diesel engine and operating from 200 to 400 rpm. They are equipped with 16 in. x 14 in. horizontal condensers.

All four compressors can be used at once for brine cooling or two can be diverted to quick-freeze rooms which are piped for direct expansion.

These compressors include such important features as Worthington Feather* Valves (simplest, most durable ever made) for both suction and discharge, unit-type manifold with quick-opening relief valve, water-jacketed cylinders, forged steel crankshafts and connecting rods.

Other Worthington equipment includes one 38 in. x 16 in. receiver and two 34 in. x 18 in. brine coolers.

Engineers: Ganteaume & McMullen, Boston.
*U. S. Reg. Pat.

A9-9

WORTHINGTON

AIR CONDITIONING AND REFRIGERATION

A complete line . . . in which *all* the vital components are *made*, not just assembled by Worthington. For more worth with Worthington, see your nearby Worthington distributor (consult Classified Telephone Directory).

Patents

Coffee Concentrate Made by Quenching Hot Roasted Coffee With Corn Syrup Solution to Entrap Volatile Coffee Constituents, Followed by Separation of Solid Insoluble Coffee Mass—*Wilbert A. Heyman, New York City. No. 2,454,510. Nov. 23, 1948.*

Foods Subjected to Rhythmic Periodic Submersion Into Liquid Refrigerant and Alternate Draining Periods During Passage Through Cooling Zone—*Floyd J. McMichael, Orlando, Fla. Nos. 2,454,704, 2,454,705, and 2,454,706. Nov. 23, 1948.*

Animal Casings for Sausage Use Subjected to Proteolytic Enzyme Action for Tenderizing Followed by Treatment to Inactivate Enzyme at Predetermined Degree of Tenderization—*John M. Ramsbottom and Levi Scott Paddock, to Swift & Co., Chicago. No. 2,454,716. Nov. 23, 1948.*

Macerated Livers Suspended in Water and Subjected to CO_2 at 600 Psi. for 20 or More Hours at 50 Deg. C.—*James A. Reyniers, Niles, Mich., to Amino Acids, Inc., Wilmington, Del. No. 2,454,837. Nov. 30, 1948.*

Glyceride Oils Heated With Activated Magnesium Oxide for 3 Hr. Between 350 to 500 Deg. C. to Stabilize Oil Against Reversion Characteristics—*Wendell W. Moyer and Ralph A. Marmor, to A. E. Staley Mfg. Co., Decatur, Ill. No. 2,454,937. Nov. 30, 1948.*

Fruits Cut and Pitted During Passage Through Machine With Rotary Blades—*Curtis Lindley, Jr., Empire, Calif. No. 2,455,072. Nov. 30, 1948.*

Fat-Containing Material Stabilized Against Oxidative Changes by Mixture With Polyphenolic Antioxidant—*Charles I. Jarowski, Springfield, and Eric T. Stiller, Philadelphia, Pa., to Wyeth, Inc., Philadelphia. No. 2,455,254. Nov. 30, 1948.*

Antioxidant for Fats Extracted From Rice Bran—*Charles I. Jarowski, Springfield, Eric T. Stiller, Philadelphia, and Martin B. Williamson, Landsdowne, Pa., to Wyeth, Inc., Philadelphia. No. 2,455,255. Nov. 30, 1948.*

Antioxidant for Fats Made to Contain Diisoeugenol—*Charles I. Jarowski, Springfield, Pa., to Wyeth, Inc., Philadelphia. No. 2,455,256. Nov. 30, 1948.*

Substantially Dry, Plastic, Edible Shortening for General Culinary Use Made to Have Penetration Index of at Least 175 at 21 Deg. C.—*Arne Gudheim, Winchester, Mass., to Lever Bros., Cambridge, Mass. No. 2,455,363. Dec. 7, 1948.*

Liquor With Relatively High Pectin Content Extracted From Citrus Fruit Peel, Adjusted to pH of 3.7 to 4.4 and Spray Dried—*Richard Carl Nelson, Clearwater Beach, Fla., to Juice Industries, Inc., Dunedin, Fla. No. 2,455,382. Dec. 7, 1948.*

Packaged Edible Food Paste Made From Smoked Meat of Rainbow Trout—*Eugene Lilly, Colorado Springs, Colo. No. 2,455,508. Dec. 7, 1948.*

Cheeses Perforated by Reciprocating Pins Operating Vertically in Alignment With Holes in Cheese-Support Plate—*Otto F. Hensel, Hustisford, Wis. No. 2,455,579. Dec. 7, 1948.*

Carbonated Beverages Made by Simultaneous Delivery of Measured Quantities of Uncarbonated Water and Syrup Into Airtight Container Under Partial Vacuum to Deaerate Mixture Prior to Carbonation—*James Cantor and Edward F. Rosenberg, to Liquid Carbonic Corp., Chicago. No. 2,455,681. Dec. 7, 1948.*

Pungent and Aromatic Characteristics of Black Pepper Stabilized Against Deterioration by Addition of Major Quantity of Salt and Minor Quantity of Viscous Partly Liquid and Partly Crystalline Extraction of Black Pepper Containing Chlorophyll Oleoresin, Volatile Pepper Oil and Piperine—*Aladar Fonyo, La Grange, Ill., to Wm. J. Stange Co., Chicago. No. 2,455,749. Dec. 7, 1948.*

Citrus Fruit Waste Converted Into Animal Feed and Fertilizer Products—*John M. Kuder, Winter Haven, Fla. No. 2,455,782. Dec. 7, 1948.*

Oil-In-Water Emulsions Made Stable by Intimate Dispersion of Glycol Alginate—*Arnold B. Steiner, La Jolla, Calif., to Kelco Co., San Diego, Calif. No. 2,455,820. Dec. 7, 1948.*

Flour Treated With 6 to 12 Parts of Alkali Solution With pH of at Least 10.5 per Part of Moisture-Free Flour to Aid in Separation of Starch Granules From Flour Protein—*Robert J. Dimler, Peoria, Ill., to United States of America. No. 2,455,981. Dec. 14, 1948.*

Pieces of Food Material Moved With Agita-

(Patents Continued)

MONOSODIUM GLUTAMATE

Hydrolyzed VEGETABLE Protein

These derivatives of wheat protein are being used by many food manufacturers to

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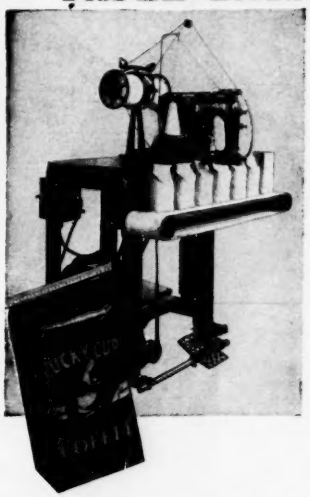

Where food products are packaged in paper bags—from 1 lb. to 25 lb. size—the closure should be firm, tight, eye-appealing, inexpensive and easy to open. The ideal closure is the Union Special *"Dubl-Tape"* Closure. Producing this closure is the final step in mechanized packaging and can best be done with the Union Special 60000 D sewing head. Mounted on the popular Style 21800 N portable, table-type, bag closing machine, this is considered *essential equipment* by many producers of dry foods. Style 21800 N machine includes a power-driven conveyor adjustable vertically to accommodate different sizes of bags. Control is by floor treadle and the unit may be operated from a sitting position. Ask for recommendations on your particular problems. Literature on request. UNION SPECIAL MACHINE CO., 450 N. Franklin St., Chicago, Ill.

Union Special

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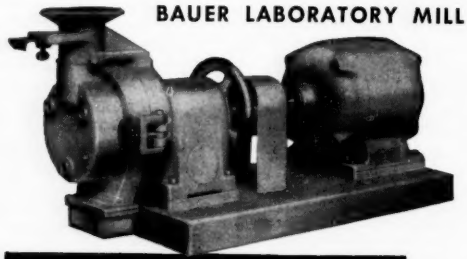

FOR SAMPLE AND TEST RUNS

This mill is equipped with a 3 or 5 h.p. built-in motor or V-sheave for belt drive. It is built with the precision required for laboratory use, but has ample stamina for production service.

The U. S. Dept. of Agriculture approves it for preparing cottonseed, soybean, and tung nut samples. The American Tung Oil Assn. specifies it for sample grinding. The American Chemists' Society endorses it.

With various designs of plates, the mill reduces all grindable materials. It recovers the entire sample. The hinged cover can be easily swung open for cleaning the interior.

You are invited to request literature and data on the Bauer No. 148-1-A Laboratory Mill.

THE BAUER BROS. CO.

1740 SHERIDAN AVE. SPRINGFIELD 99, OHIO

Patents

tion and Application of Moisture Through Chamber Under Sufficiently High Vacuum to Effect Freezing—*John J. Hoffman, Point Pleasant, N. Y., to Beech-Nut Packing Co., Canajoharie, N. Y. No. 2,456,124. Dec. 14, 1948.*

Blood Proteins Heat-Coagulated and Digested With Pancreatic Enzyme to Convert 85 Percent of Proteins to Amino Acids With Not More Than 10 Percent of Free Amino Acid in Final Hydrolysate Derived From Pancreatic Enzyme Preparation—*Daniel Melnick, Kew Gardens Hills, N. Y., to Food Research Laboratories, Inc. No. 2,456,297. Dec. 14, 1948.*

Dough Mechanically Formed Into Roll for Subsequent Baking From Continuously Advancing Sheet of Dough of Uniform Width and Thickness Without Stratification or Tears —*John Buechek, Kokomo, Ind., one-half to American Bakers Machinery Co., St. Louis, Mo. No. 2,456,372. Dec. 14, 1948.*

Baking Dough Continuously Sheeted From Plurality of Dough Masses—*John Buechek, Kokomo, Ind., one-half to American Bakers Machinery Co., St. Louis, Mo. No. 2,456,371. Dec. 14, 1948.*

Riboflavin Synthesized—*Leo A. Flexser, Elizabeth, and Walter G. Farkas, Palisades Park, N. J., to Hoffman-La Roche Inc., Nutley, N. J. No. 2,456,395. Dec. 14, 1948.*

Coconuts Mechanically Peeled by Rotary Radial Cutter Blades Concavely Curved to Serve Also as Fan Blades—*Otto G. Rieske, Buffalo, N. Y. No. 2,456,446. Dec. 14, 1948.*

Crude Aqueous Solutions of Inositol Refined by Hydrolyzing Phytin Content, Removing Solids, and Decolorizing Resulting Liquid—*McCalip J. Thomas, to A. E. Staley Mfg. Co., Decatur, Ill. No. 2,456,470. Dec. 14, 1948.*

Sugar Cane Wax Freed of Resinous Fraction by Extraction With Alcohol Containing Not More Than Three Carbon Atoms—*E. S. McLoud, Racine, Wis. to S. C. Johnson & Son, Inc. No. 2,456,641. Dec. 21, 1948.*

Crude Sugar Cane Waxes Separated Into Various Fractions by Extraction With Selective Fat Solvents While in Molten State—*O. J. Swenson, Ithaca, N. Y., to Colonial Sugars Co., New York City, and S. C. Johnson & Son, Inc., Racine. No. 2,456,655. Dec. 21, 1948.*

Hard Wax Fraction of Crude Sugar Cane Wax Recovered by Solvent Extraction at Temperature Which Precipitates Hard Fraction From Solution—*O. J. Swenson, Ithaca, N. Y., to Colonial Sugars Co., New York City, and S. C. Johnson & Son, Inc., Racine, Wis. No. 2,456,656. Dec. 21, 1948.*

Crude Sugar Cane Wax Treated With Three Times its Weight of Propyl Alcohol at Temperature Conducive to Solution of Waxy Portion of Mixture—*E. A. Wilder, Racine, Wis., to S. C. Johnson & Son, Inc., Racine, Wis. No. 2,456,661. Dec. 21, 1948.*

Animal Fatty Tissue Macerated and Treated With Aqueous Alkali Solution at Temperature Between 70 to 100 Deg. C. for 30 to 60 Min. for Separation and Recovery of Fat—*F. E. Deatherage, Cincinnati, Ohio, to Kroger Grocery & Baking Co., Hamilton County, Ohio. No. 2,456,684. Dec. 21, 1948.*

Natural Fat Containing Glyceryl Esters of Oleic Acid Isomerized by Treatment With So-

(Patents Continued)

Patents

lution of Nitrous Acid in Water-Miscible Organic Fat Solvent Under Controlled Temperatures—*Wm. R. Eipper, Philadelphia, Pa. No. 2,456,691. Dec. 21, 1948.*

Bread Sliced in Machine Equipped With Gangs of Rotary Disk Knives—*H. J. Criner, one-half to A. G. Bush, Davenport, Iowa. No. 2,456,866. Dec. 21, 1948.*

Foodstuff Sterilized by Bombardment With High Speed Electrons Without Development of Harmful Side Reactions.—*Arno Brasch, Brooklyn, N. Y., to Electronized Chemical Corp. No. 2,456,909. Dec. 21, 1948.*

Fat Stabilized by Inclusion of Antioxidant Consisting Substantially of About 15 Percent by Weight of Water and Organic Sulphur Compound—*P. Gyorgy, Cleveland, and M. B. Williamson and E. T. Stiller, Chagrin Falls, Ohio to Wveth Inc., Philadelphia, Pa. No. 2,456,937. Dec. 21, 1948.*

Water Soluble Coffee Concentrate Made In Form of Vitrified Non-Hygroscopic Mass Consisting of Extractives From Coffee Beans and Carbohydrate (Sorbitol) Base—*A. A. Epstein, New York, N. Y. No. 2,457,036. Dec. 21, 1948.*

Scrapple Made to Contain Sova Flour, Ascorbic Acid and Tocopherol and Dehydrated to possess Non-Crumbly Rehydratable and Rancidity-Inhibiting Properties—*A. F. Morgan, Berkeley, Calif., and B. M. Watts, Pullman, Wash., to United States of America. No. 2,457,063. Dec. 21, 1948.*

Chocolate-Coated Edibles Made by Dipping Edible Mass in Homogeneous Liquid Consisting of Chocolate Coating and Water—*H. R. Burbank, New York City, and B. J. Zenlea, Ozone Park, N. Y., to Rockwood & Co., Brooklyn, N. Y. No. 2,457,110. Dec. 28, 1948.*

Lysine and Arginine Separated From Hydrolyzed Protein Containing Other Amino Acids—*D. J. Bernardi, Bronx County, N. Y., toInterchemical Corp. No. 2,457,117. Dec. 28, 1948.*

Edible Vegetable, Animal and Fish Oils, Fats and Waxes Containing Metals Protected Against Rancidity by Heating With Beta-Mercaptopropionic Compound and Removing Precipitated Metal—*M. F. Gribbins, to E. I. du Pont de Nemours & Co., Wilmington, Del. No. 2,457, 227. Dec. 28, 1948.*

Fruit Juice Volatile Flavors Recovered and Concentrated to 25-Fold by Fractional Distillation and Condensing—*H. P. Milleville, Philadelphia, Pa., to United States of America. No. 2,457,315. Dec. 28, 1948.*

Eggs Cleaned by Action of Sanding Belts in Machine Having Cradle Action and Equipped With Resilient Rollers to Rotate Eggs About Longitudinal Axis—*E. W. Shock, Rogue River, Ore. No. 2,457,324. Dec. 28, 1948.*

Lactalbumin In Water Adjusted to pH of 7.3 to 8.0, Treated With Proteolytic Enzyme and Dried to Form Powder Capable of Reconstitution in Colloidal Suspension by Addition of Water—*Geo. P. Butterfield, Desplaines, and Lois A. Thorne, Chicago, to American Seal-Kap Corp., Wilmington, Del. No. 2,457,642. Dec. 28, 1948.*

Fatty Material Stabilized Against Oxidative Deterioration by Addition of Fat Extract of Leaves and Stems of *Larrea divaricata*—*J. R. Shipner, South Omaha, Neb., to Cudahy Packing Co., Chicago. No. 2,457,741. Dec. 28, 1948.*

—End

This amazing wheat starch not only costs you *less* than imported root starches, but can help make your food products *better!* It is a laboratory controlled, chemically modified starch created by General Mills to meet the requirements of the food industry. Easy to handle, it offers you outstanding results!

Here are a few examples of the improvement A-22 makes in food products:

Salad Dressing: A-22's greater water-taking capacity makes possible a 5 to 7% total starch reduction and improves stability. An all-weather starch, it retards both bleeding and setting.

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Soups: A-22 *alone* replaces the usual blend of starches used for desired consistency in cream and dehydrated soups. It improves body and flavor by helping disperse fat solids throughout soups and helping prevent surface fat film.

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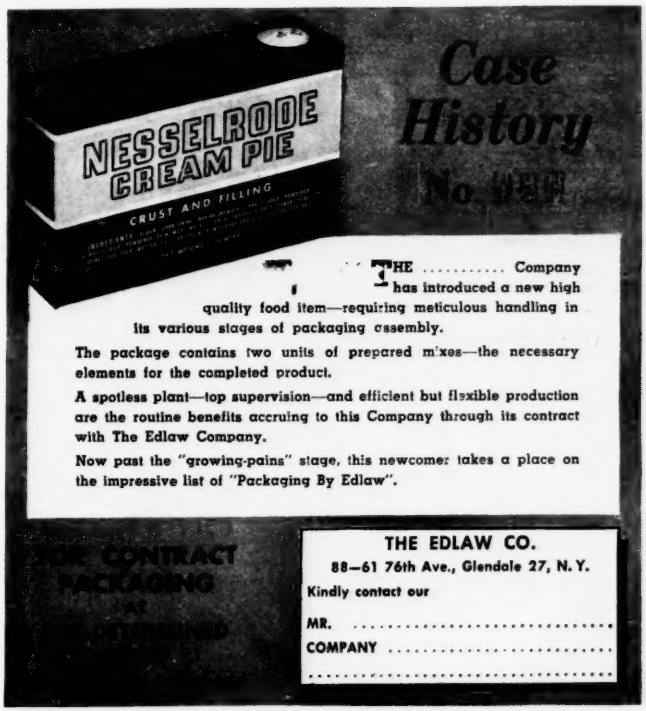
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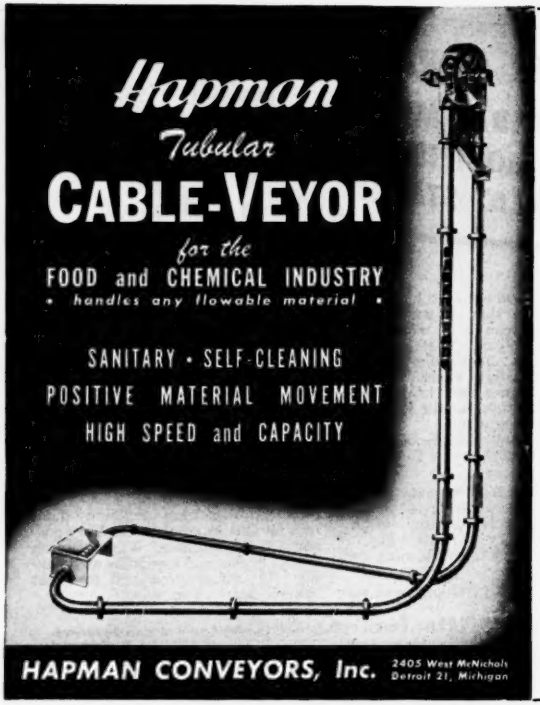

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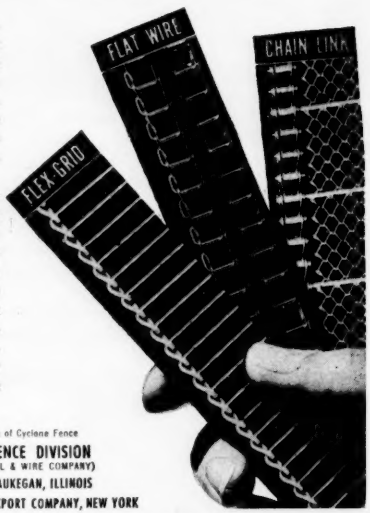
Cyclone offers 3 types of conveyor belts — Flex-Grid, Flat Wire, Chain Link — in a wide variety of metals and alloys — designed to fit the operating conditions of every plant and give smooth, continuous service without unnecessary delays and tie-ups.

If you are planning a new belt installation or are remodeling your old one—get in touch with our nearest sales office and one of our engineers will help you select the belt best suited to your needs. Don't forget that Cyclone has 25 years of experience in the manufacture and installation of the best conveyor belts obtainable. Write for a free copy of our new catalog #4.



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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

UNITED STATES STEEL

Frozen Orange Juice

—*Continued from page* 116

premium of as much as 20 percent for quality of fruit above a minimum.

By maintaining a superior quality level, the frozen citrus juice concentrate industry can pave the way for raising the quality level of all citrus products Florida ships to market. This can increase the consumer acceptance for the state's citrus products and better the growers' income.

Florida has had six bumper citrus crops in a row, but the future does not look too good. The 1947-48 crop was the largest—10 percent larger than the bumper 45-46 harvest. But it sold for 64 percent less. Cash returns have been tobogganing, while costs of labor and transportation have skyrocketed.

The state has cause for alarm. A crop which can bring $250,000,000 a year into the coffers is a major consideration. Only the tourist crop brings in a better income. A citrus slump could be a tragic outlook if it were not for the promising frozen concentrate.

When the 1945-46 bumper crop sold at high prices, the growers were happy, but also apprehensive. In the last 30 years, the citrus acreage has increased 300 percent in the U.S.—but 500 percent in Florida. Florida now produces half of the nation's citrus. But it also fears over-production.

Growers, packers, processors, and the man on the street are loath to admit that the fresh fruit and processed products Florida ships to market are not always the best, but sometimes this situation obtains. The urge to "get while the gettin's good"—to pick and sell before the market shrinks—is largely responsible for shipping products of lower quality.

Processing plants, willingly or not are sometimes drawn into the mad race to be first on the market and last to end the operating season. Fresh fruit packers have been operating a number of plants to process the discard, skin-blemished, and off-size fruit. Others have been absorbing the rejects of packers who have no processing plants.

Now, with the advent of the frozen juice concentrate industry with its high standards—and promising future—the picture looks brighter. Estimates of the processors are for about 6,000,000 gal. of concentrate this coming year. This is the equivalent of about 5,000,000 boxes of fruit. If this level—considered conservative—is reached, the frozen concentrate will account for 8 percent of the state's total orange crop.

Even in 1942, when Florida's citrus canning was 18 years old, no total as great as 5,000,000 boxes annually was

being used by the industry. And yet the frozen concentrate plants—only a few years old and just starting to grow—already promise such a consumption.

The comparison is more remarkable than it appears at first reasoning. Although canned foods are sold in all grocery stores, it must be remembered that frozen foods sales are limited to the retail outlets with the frozen food cabinets—and these amount to only 1 percent of the total number of stores.

Finally, this development may prove to be even more than a big rise of frozen citrus juice concentrates—for this innovation also points the way to improvement of processes in other branches of industry. The juices of deciduous fruits could be similarly processed.

If milk could be successfully concentrated and frozen through an adaptation of the process, then it would become a prime item in the cabinets of the retail frozen food outlets. And this would bring frozen food cabinets into many more stores.

—End—

Three-Element Colloid

—Continued from page 109

The increase in strength upon aging at pH 4.15 and 4.40 cannot be explained. The temperature of measurement did not influence the strength values because all gels were held at 80 deg. F. for 18 hr. prior to measurement.

The conclusion from these experiments was that the gels would make satisfactory canned-dessert gels as far as aging is concerned, provided their pH is above 3.75.

Manufacture of a canned vegetable juice gel which might be used for salad purposes has long been the desire of many canners. A study of the relative merits of low-methoxyl pectin and the new three-component system (carrageen-locust bean gum-potassium salt) was made by J. G. Jarrell while he was a student at the University of Delaware. He concluded that the carrageen gel mixture is better because it is more economical, that it yields a more attractive product, and that the change in the strength of its gels upon storage is negligible.

Jarrell varied the components of the gelling mixture in order to get proportions which produced satisfactory gels after processing and storage. He found some difficulty in dispersing the dry mixture in the tomato juice, but this was considered unimportant. The use of a colloid mill in practice was suggested. The study indicated:

". . . the most favorable method of preparing the tomato gel was the addition of one part gelling mixture (19.1 percent Krim-Ko Gel, the carrageen

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extract; 12.7 percent locust bean gum; 20.5 percent potassium chloride; and 47.7 percent dextrose) slowly to 23 parts tomato juice at 80 deg. F. with vigorous stirring. The entire mass was then heated on a steam bath to 206.6 deg. F. and poured into cans and sealed. The sealed cans were then held in boiling water for 20 min. and air-cooled."

It was also indicated by the study that continuous methods of manufacture could be easily devised.

Carrageen gel mixtures containing of varying proportions of ingredients, have other uses, depending upon the desired elasticity in the products and pH. These uses are: 1. Various confectioners' gels; 2. non-acid and mildly-acid gels from apple, peach, pear and prune juices; 3. opaque gels containing bananas, coconut, sweet potatoes, and the like; 4. spice gels; and 5. aspic gels.

Prune juice, for instance, makes an exceptionally good gel. As an example, a sweetened product can be made from 1 lb. of the three-component gel mixture (50 percent of carrageen, 33⅓ percent of locust bean gum, and 16⅔ percent of potassium chloride), 22 lb. of sugar, and 70 lb. of prune juice. The sugar and gel composition is mixed. The prune juice is added to the mixture (slowly, with stirring), and then the mixture is boiled to the desired finishing weight (216 deg. F., if desired). When poured, this makes a gelled product of 40 percent soluble solids content.

The three-element composition should prove valuable in gelled consomme and in gelled fish and meat products.

Powdered gel mixtures can be made which should prove beneficial for bakers' jelly needs. Since sugars aid, rather than hinder, the dispersion of the carrageen-gum-potassium salt, desired amounts may be added in full and intimately mixed with the gelling ingredients. Potassium citrate may be used in place of potassium chloride if an undesirable slightly salty flavor is imparted to the gelled product by the chloride.

An advantageous characteristic of these gels should be noted: If they break during shipment due to rough handling, they can be remelted and regelled with ease.

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Nutritional Advances

—Continued from page 84

animals, under specific conditions, a generous intake of riboflavin, choline or protein can exert a favorable influence in warding off cancer-type growths, particularly in the liver. The observations of Copeland and others working with Dr. Salmon on choline have been confirmed during the past year. It is interesting to note that the original strain of animals found to be susceptible to cancer as a result of long periods of choline deficiency, have a choline requirement that is higher than normal. The Yale group has observed, similarly, that the strain of experimental animals found to be highly susceptible to cancer as a result of riboflavin deficiency, was characterized by a high riboflavin requirement.

In the popular press, one often sees reference to claims that dietary deficiencies in trace minerals, vitamins, or other nutrients, constitute a cause of cancer in the human population. A conservative appraisal of the evidence certainly does not justify such claims. Leading scientists, studying the cancer problem, have a few basic points to guide them in their search to find the cause or causes—but they still do not know the cause for most of the cancer cases that reach our clinics.

Food practices may have a bearing on the problem, but there is no justification to assume, on the basis of the evidence thus far, that food is a significant factor.

One point should be emphasized in this area of thinking: Insofar as research scientists studying nutrition can gain a better insight into the phenomena of what occurs in living cells and in the animal body, their discoveries will provide powerful ammunition for attack on cancer.

Two other medical problems being re-examined from the standpoint of nutrition are maternal health and child health. Several years ago, the Harvard group made a study in the Boston area of relationships between the food habits of mothers and the health of these mothers and their infants. The data gathered showed a striking correlation between the quality of diets and the resultant health records of the mothers and infants.

Relationships cited in the reports were so arresting that many persons found it difficult to believe. During recent years, the group associated with Dr. Harold Stuart has re-studied a similar number of new cases. They report, from their preliminary summaries, that the same striking relationship between nutrition and health is indicated.

Fig. 2140
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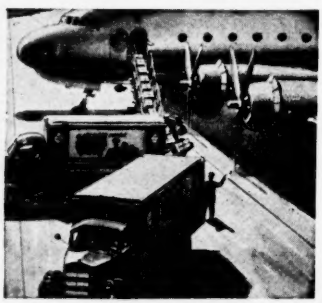

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In terms of numbers and statistical data, the reports from Britain during the war and postwar years furnish an impressive record for a large population mass. Although maternal and infant death rates rose sharply during the first year of the war, the well organized nutrition program from then until the end of the war, resulted in a drop in the maternal and infant death rates to all-time low levels. And they continued their downward trend in each succeeding year, through 1947 (latest data).

The gains in public health from relatively simple measures to improve food practices were so striking in the British record that one can scarcely look at them and fail to be impressed with the significance of the data. It is reassuring to have underway very careful appraisals of the food and health situation in different American areas, so that we will have records available in future years on such communities as Philadelphia, Denver, Detroit, Nashville, New Orleans, Rochester, N. Y., and Rochester, Minn.

Future trends in the food industry are almost certain to include due consideration of the consumers' health. This point of view need not be in conflict with reasonable aspects of enjoyment and economy.

—*End*

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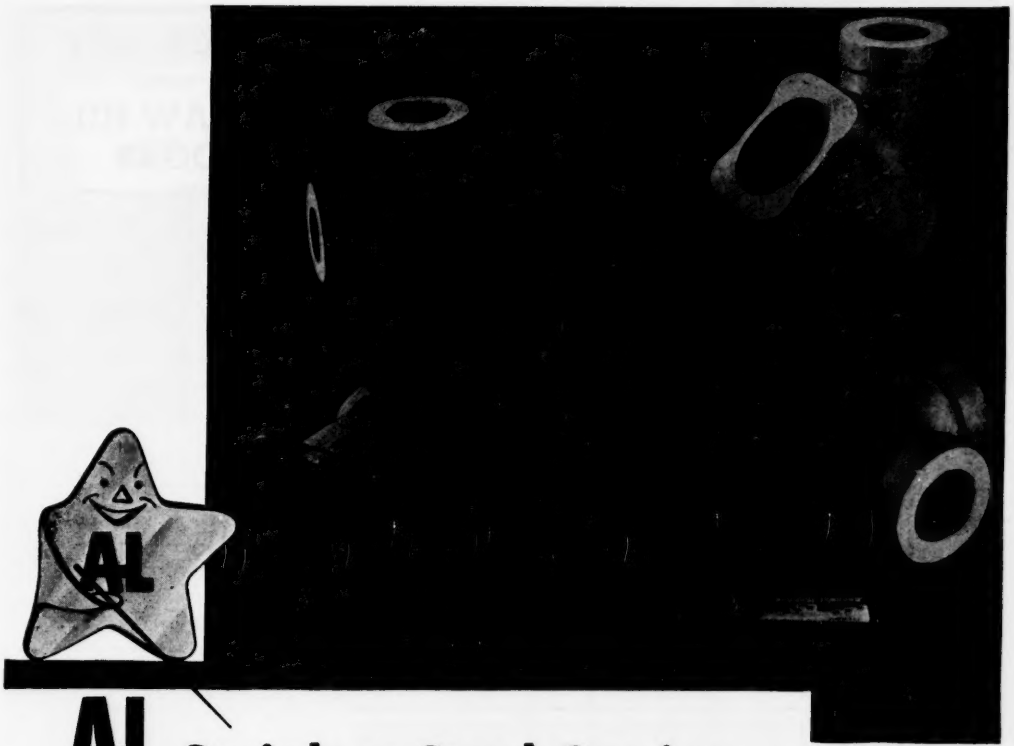

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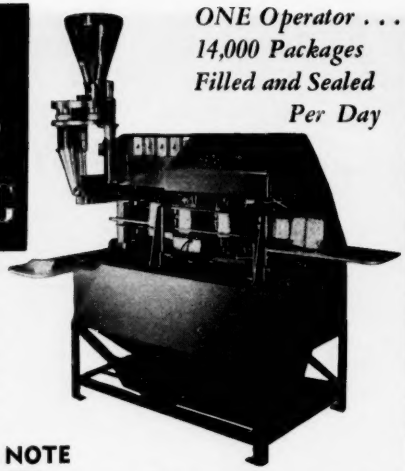

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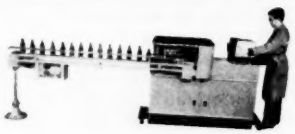

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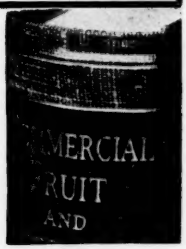

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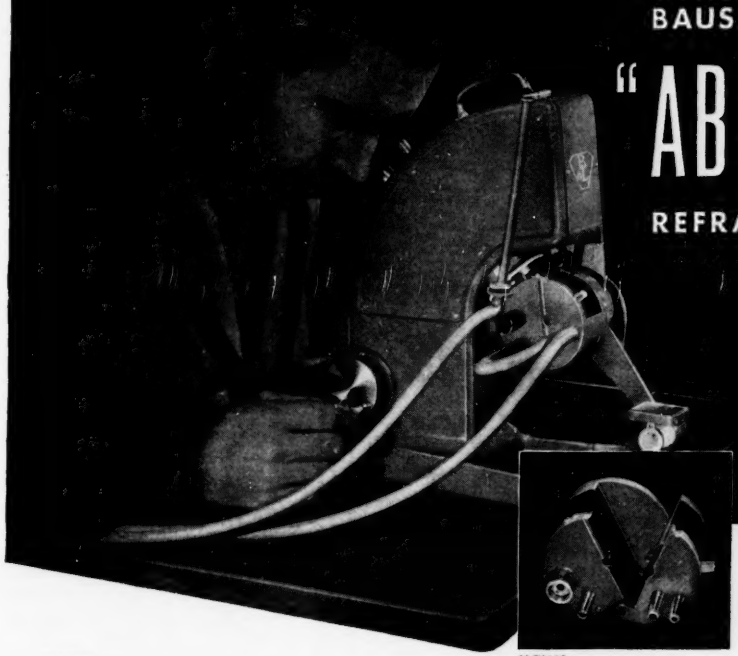

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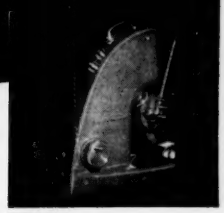

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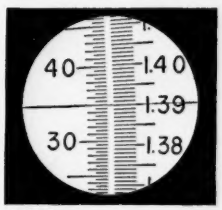

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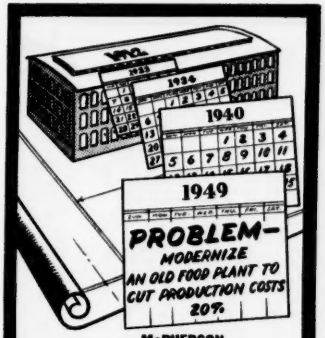

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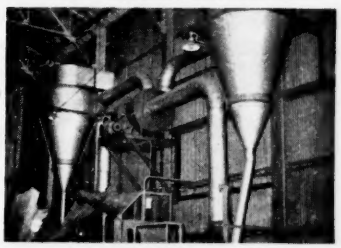

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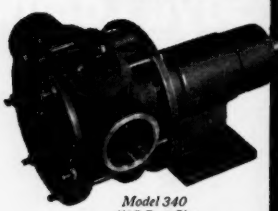

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1½" Port Size
Models also available in ¾" and 1" port sizes.

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and Wm. N. Witheridge,
Ventilation Consultant, General Motors Corporation, Detroit

397 pages, 6 x 9, Illustrated, $6.50

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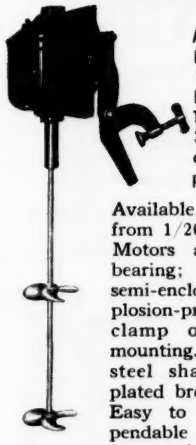

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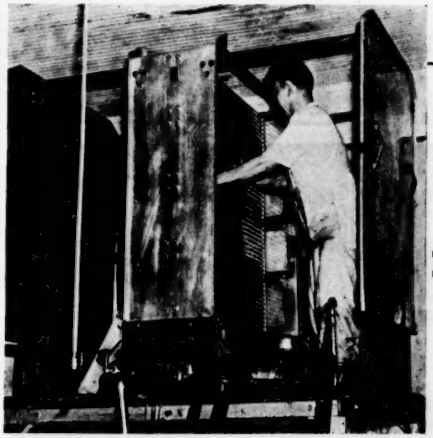

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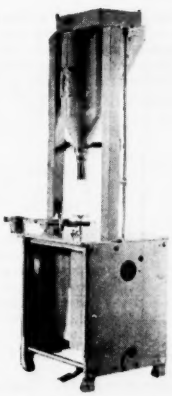

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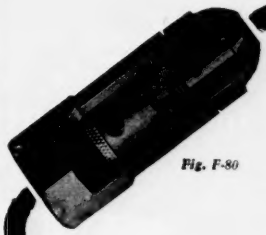

Fig. F-80

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TOTAL	$500

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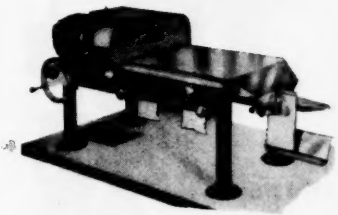

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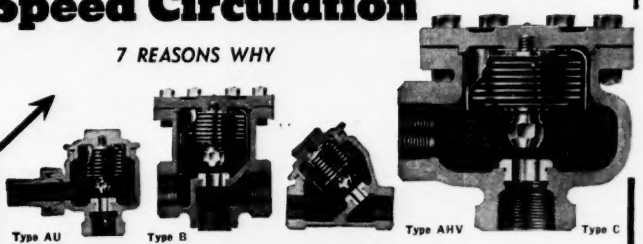

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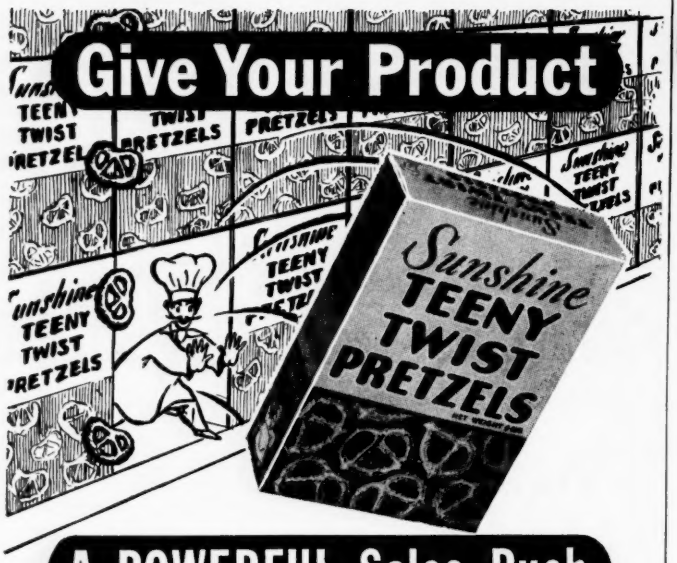

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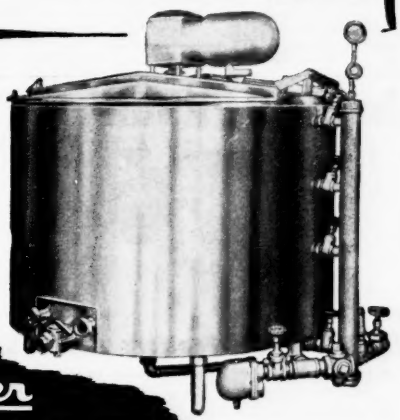

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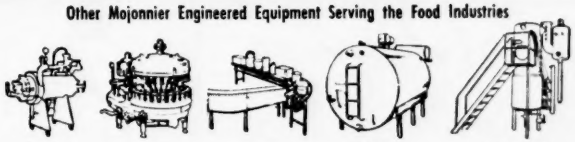

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Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil, and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET
New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

NEW ADVERTISEMENTS
must be received by May 15th to appear in the June issue.

Address copy to the Classified Advertising Staff
FOOD INDUSTRIES
330 West 42nd St., New York City

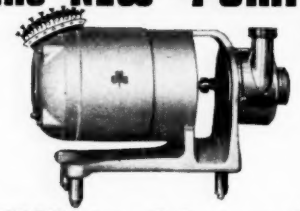
WHERE TO BUY

CHECK shipping room savings possible with Marsh Stencil Machines, Brushes, Inks! Electric and Hand Operated machines cut ½", ¾", 1" letters. For sample stencil, Shippers' Handbook, prices, pin this to business letterhead with your name.
MARSH STENCIL MACHINE CO.
489 Marsh Bldg. • Belleville 9, U.S.A.

KIWI CODE DATER
Clamps on any conveyor. Top, side or bottom. Automatic, Unconditionally Guaranteed. Economical, Accurate. Neat. Write for Details.
KIWI CODERS CORP.
3804 No. Clark St. Chicago, 13, Ill.

POINT OF SALE ADVERTISING
Colorful - Self Adhesive - Cellophane, processed in Rolls. Easy to buy - Easy to apply - used for Packaging - Point of Sale Advertising - Dealer Instructions - Distributor literature imprints.
TOPFLIGHT TAPE CO. YORK, PA.

the NEW "PUMP KING" SERIES



'Pump King" series sanitary centrifugal pumps are available in 1½", 2", 2½" and 3" inlet sizes, with totally enclosed, long-life sanitary motors.

"TOPS" for all Sanitary Applications!

- Compact "Unimount" close-coupled construction.
- All highly polished stainless steel contact parts.
- Perfect alignment at all times.
- Fewer moving parts . . . easier to disassemble for cleaning.
- Pump head easily adjusted to any discharge angle.
- One-piece sanitary seal . . . easily cleaned, maintains correct sealing pressure without causing wear.

(Also available with packing gland construction or water cooled vacuum seal for special requirements.)

SEE YOUR TRI-CLOVER JOBBER OR WRITE FOR DETAILS

Tri-Clover MACHINE CO.
Kenosha, Wisconsin

TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES
Try TRI-CLOVER
THE Complete LINE
FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

DETECTO SCALES

There's a precision-accurate Detecto Scale for your specific weighing and counting need. The Detecto helps increase production, yet assures you maximum accuracy by making slightest weight discrepancies immediately visible.

DETECTO POST-O-METER
The Modern Parcel Post Scale. Just press the zone key. There's one figure—the correct postage—illuminated, easy-to-read.

Write for Catalogue

DETECTO • SCALES • INC.
MAKERS OF FINE SCALES SINCE 1900
545 F PARK AVE. • BROOKLYN 5, N. Y.
SCALE ENGINEERS IN ALL PRINCIPAL CITIES

PRICE REDUCED!

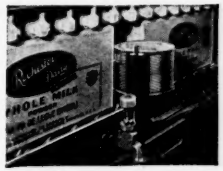
on all models

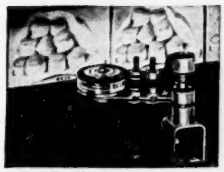
GOTTSCHO

ROLACODER*

MARKING and CODE-DATING MACHINE

A labor-saving device
that pays for itself in weeks!





Volume production of famous ROLACODER Marking and Code-Dating Machines now makes drastic price reductions possible. Now—for an investment of well under one hundred dollars—you can use a ROLACODER to replace package-marking personnel . . . cut your payroll. The ROLACODER automatically marks primary packages or shippers in sealing, packaging and conveying operations. Makes sharp, permanent marks—large or small—from interchangeable type or dies. Friction-operated . . . self-inking . . . easy to install.

Write for Data Sheet 6.0 . . . and new reduced price schedule

** Pat. Pending*

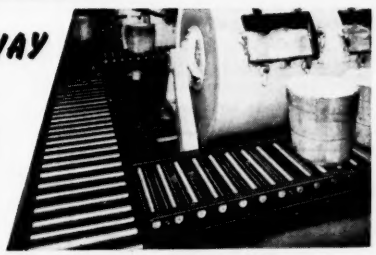
MARK O MATIC

ADOLPH GOTTSCHO, INC.

MACHINES TO MARK WHATEVER YOU MAKE

191 Duane Street • New York 13, N. Y.

LOWEST COST WAY to handle EVERY FOOD PRODUCT!



— an ALVEY-FERGUSON ENGINEERED Completely Co-ordinated Conveying System

BEFORE this A-F *Engineered* Completely Co-ordinated Conveying System was installed in the food plant above, a thorough study of all operating conditions was made. The question: which types of conveyors would best fit the problem? The answer: a combination of A-F Gravity Roller and A-F Live Roller Conveyors. The results: higher production with a minimum of employee fatigue! Greater savings in every department! Why be satisfied with less?

May we discuss the latest materials handling and products handling methods with you? Free folder on request —write today!

THE ALVEY-FERGUSON COMPANY

177 Disney Street *Established 1901* Cincinnati 9, Ohio

Offices or Representatives in Principal Cities—Coast to Coast

CONVEYING EQUIPMENT

Alvey-Ferguson

WASHING MACHINES FOR INDUSTRY

What Makes A Mailing Click?

● *Advertising men agree —the list is more than half the story.*

McGraw-Hill Mailing Lists, used by leading manufacturers and industrial service organizations, direct your advertising and sales promotional efforts to key purchasing power. They offer thorough horizontal and vertical coverage of major markets, including new personnel and plants. Selections may be made to fit your own special requirements.

New names are added to every McGraw-Hill list daily. List revisions are made on a twenty-four hour basis. And all names are guaranteed accurate within two per cent.

In view of present day difficulties in maintaining your own mailing lists, this efficient personalized service is particularly important in securing the comprehensive market coverage you need and want. Ask for more detailed information today. You'll probably be surprised at the low over-all cost and the tested effectiveness of these hand-picked selections.

McGraw-Hill Publishing Co., Inc.

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330 WEST 42nd ST.

NEW YORK 18, N. Y.

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PROCESSING PROBLEMS — PRODUCT DEVELOPMENT — MARKET RESEARCH — PLANT LAYOUT and DESIGN — PACKAGE DESIGN and TESTING MANAGEMENT — PUBLIC RELATIONS — GENERAL CONSULTING — PATENTS — CHEMICAL, BACTERIOLOGICAL and NUTRITIONAL ANALYSIS

ASSOCIATED ENGINEERS, INC.

Consulting Engineers
Food Production Development

Analysis - Processing
Structural Design
Special Equipment Design
and Development

230 E. Berry St. Ft. Wayne, Ind.

J. Paul Bishop and Associates

Consulting Chemical Engineers and Food Technologists

Reports—Layouts—Canning and Freezing Processes—Food Bacteriology—Sanitary Control—Food Engineering — Atmospheric Pollution — Unit Operations—Process, Product and Equipment Design—Industrial Heating, Ventilating, Air Conditioning and Refrigeration.
Write for brochure—mentioning this publication.
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FOOD RESEARCH LABORATORIES, INC.

Philip B. Hawk, Ph.D., President
Bernard L. Oser, Ph.D., Director

Research, Analyses, Consultation for the Food, Drug and Allied Industries.
Write for descriptive brochure.
48-14 33rd Street, Long Island City, N. Y.

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Registered Patent Attorneys

Patent Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request.
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DAVID N. LEWIN, Ph.D., FOOD CONSULTANT
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Designs—Layouts—Investigations—Consultations—Reports—Market Investigations—Consultations in all phases of Food Preserving by Heat, Drying, Freezing—Consultation in Managing, Warehousing, Distribution—Control and Time Studies.
200 W. 57th St., N. Y. 19, N. Y., CIrcle 6-0785-6

MODERN VINEGAR SERVICE

Large recirculating vinegar making units to fit any requirements. Design, Installation, Operation, Alterations, Consultation.

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Consulting Chemical Engineer

Development Continuous Processes
Carbohydrate Industry — By-Products
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Packard Building Philadelphia 2, Pa.

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Chemical and biological analyses of food materials and products. Food plant design, inspection, process examination and control. More than 75 years of experience serving the food and beverage industries.
Write for bulletin
"Scientific Quality Control of Foods and Beverages"
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FOSTER D. SNELL, INC.

Research Chemists and Engineers

A staff of 75 including chemists, engineers, bacteriologists and medical personnel with 10 stories of laboratories and a pilot plant are available for the solution of your chemical and engineering problems. Write today for Booklet No. 13.
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Investigations Designs Engineering
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Special Service to Small Industries
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Consulting Engineers to the Food Industries

Mechanical Management and Process Engineering. Investigation and Reports. Plant Layout and Design. Methods and Procedures.
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Food Technologists and Engineers

Specialists in Food Preparation and Preservation; Equipment Testing and Evaluation; Food Freezing; By-Product Utilization; Manufacture of Pure Fruit Flavors.

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James F. Walsh & Associates

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Complete Analytical, Research & Pilot Plant Facilities: For the Carbohydrate and Allied Trades—Foods, Processes, Improved and New products—General Analytical Work. Investigation of new products and processes.

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EASTERN ASSOCIATES
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New York 34, New York

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Designers of Special equipment and complete plants

Quality Dehydration and Conditioning a specialty

Established 1930

31-04 Northern Blvd. Long Island City, N. Y.

WISCONSIN ALUMNI RESEARCH FOUNDATION

Laboratory Services

Vitamin Assays
Mineral Determinations
Food Bacteriology
P. O. Box 2059
Madison 1, Wisconsin

Consult these SPECIALISTS

Let them save your time by bringing their broad experience in their specialty to bear on your problems.

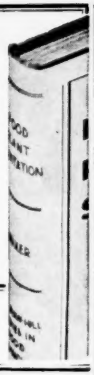
F—13A

Manufacturers use the advertising pages in this magazine to get *news* about their products or services to *you*... quickly and effectively. Their advertisements contain information designed to help you do your job better, quicker, and cheaper, which is just as newsworthy as the editorial columns.

To be well-informed about the latest developments in *your* business, *your* industry...and to stay well-informed... *read all the ads too.*

McGRAW-HILL PUBLICATIONS

Helpful books for the FOOD TECHNICIAN



Examine them 10 days free

1 FOOD PLANT SANITATION

By Milton E. Parker. Offers proven sanitation methods on everything from effective plant layout and design to the proper selection of packaging materials. Makes available to you practices in accordance with the Federal Food, Drug and Cosmetic Act. **$6.00**

2 FLAVOR

By C. E. Crocker. A source of reference information on every aspect of flavor and taste. Includes the chemistry of flavoring agents and condiments . . . methods of developing flavor in processed foods . . . methods for the detection, correction and prevention of undesirable flavor in commercial products. **$3.00**

3 Commercial Fruit and Vegetable Products

By W. V. Cruess. A thorough treatment of the application of scientific principles to the manufacturing and preserving processes. Covers important advances in canning, spoilage, frozen-pack foods, packaging, etc. New Third edition. **$8.50**

4 FOOD TECHNOLOGY

By S. C. Prescott and B. E. Proctor. This book discusses the manner in which foods are harvested, transported, manufactured and prepared for use; why certain processes are utilized and how the methods are practiced. **$5.50**

5 MILK and MILK PROCESSING

By B. L. Herrington. Gives the basic information necessary for work in the dairy industry and understanding of milk and milk products. Emphasizes the principles underlying the processing of milk and gives background material on biochemistry. **$3.75**

6 INDUSTRIAL MICRO-BIOLOGY

By S. C. Prescott and C. G. Dunn. Deals with the fundamentals of the utilization of yeasts, bacteria, and molds for the production of industrially important products . . . the organisms, their cultivation, end-products and biochemistry of fermentation. **$6.00**

Free Examination—Order by number

McGraw-Hill Book Co., 330 W. 42nd St., NYC 18

Send me book(s) corresponding to the numbers encircled below for ten days' examination on approval. In ten days I will remit cost of the books I keep, plus few cents delivery charges, and return unwanted books postpaid. We pay mailing costs if you send cash with this coupon. Same return privilege.

1 2 3 4 5 6

Name .....

Address .....

City .....Zone.....State.....

Company .....

Position F-Food-5-49

POWERS No. 11 Self-Acting REGULATORS

now give you **MORE** *for your money*

OVER-HEAT PROTECTION

No Extra Charge

Sizes: ½ to 2" inclusive

VALVE STEM LUBRICATOR

TEMPERATURE ADJUSTMENT 60° F. ranges available

UNSURPASSED FOR DEPENDABILITY and LONG LIFE

CONTROLS HEATING OR COOLING MEDIUMS LIQUIDS OR AIR

Lower Maintenance Cost and—

BETTER

TEMPERATURE CONTROL

No. 11 INDICATING REGULATOR has 4" dial mounted on top of regulator. Both thermometer and regulator operate from same thermal system. Visual check on performance of regulator is provided making it easy to adjust for different temperatures. (11B5)

SIMPLIFY your temperature control problems by standardizing on POWERS No. 11 Self-acting Regulators. Use them when you want a simple rugged control to maintain a constant temperature. They prevent OVER-heating, save fuel and labor, pay back their cost several times a year and give years of dependable control.

Backed by over 55 years of experience in self-acting regulators. Engineering service available in over 50 cities.

TYPES AVAILABLE—Direct and reverse acting regulators with Double Seat balanced valve, double unions ½ to 2" incl., flanged 2½ to 6" incl.; Single Seat valve double unions ¼ to 1¼" incl. 3-Way valve ½ to 4" incl. —shown in Bulletin 329.

Use coupon below

THE POWERS REGULATOR CO., 2793 Greenview Ave., Chicago 14, Ill.

Gentlemen: Please send me Bulletin 329. Am interested in control for

_____

Name_____ Title_____

Firm Name_____

Address_____

Get Bulletin 329

One of a series *of messages to help you increase your understanding of business paper advertising, and its effect on your job.*

No matter what you make —you're not making it at a profit !

YOU MAY HAVE the finest product of its kind. Your production set-up may be a miracle of efficiency. Perhaps you've even discovered how to cut your cost-per-unit below that of your closest competition. The fact remains —

You're still not *making* anything at a profit. Because actually, of course, there is no such thing.

Goods can only be *sold* at a profit. And selling them profitably requires the same kind of mechanization that keeps your production costs down.

In the *manufacture of a sale*, for example, there are five basic operations —

1. **Seeking out prospects**
2. **Arousing their interest**
3. **Creating a preference for your product**
4. **Making a specific proposal**
5. **Closing the order**

Any good salesman can handle all five. But no salesman should *have* to — not when the first three can be mechanized so economically through the use of advertising.

For good advertising, like the machine on your production line, is a multiplier of individual effort, enabling all of us to produce (and *earn*) far more than we could alone.

And when it goes to work in *business papers* — with their tremendous concentration of hand-picked prospects — advertising becomes the most efficient machine available for manufacturing sales at a profit!

FOOD INDUSTRIES

A McGRAW-HILL PUBLICATION
330 West 42nd Street
New York 18, N. Y.

is a member of The Associated Business Papers, who have published an interesting folder entitled, "10 ways to measure advertising effectiveness." We'll be glad to send you a copy. And if you'd like reprints of this advertisement (or the entire series) to pass along to others in your organization, just say the word.

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:

Not available for equipment advertising
$1.20 a Line—Minimum 4 Lines.
To figure advance payment count 5 average words as a line.
INDIVIDUAL EMPLOYMENT WANTED undisplayed advertising rate is one-half of above rate, payable in advance.
PROPOSALS, $1.20 a line an insertion.

INFORMATION:

BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices, count as one additional line.

DISCOUNT OF 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED RATE:

The advertising rate is $9.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. F. I.

NEW ADVERTISEMENTS received by 10 A. M. May 18th will appear in the June issue subject to limitations of space available

CHEMISTS CHEM. ENGRS.

Food Technologist, Ph.D.....$8,400
Plant Production Sup't., Cereals.....$7,200
Biochemist—Bacteriologist
Dvg. Wisconsin.....$6,000
Many other Jr. & Sr. Positions.....—

Please write, GLADYS HUNTING.

CASTLE & ASSOCIATES, INC.
220 S. State St. Chicago 4, Ill.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

FOOD CHEMIST, excellent opportunity for an experienced chemist in the bakery supply field. The man we need must have practical experience in the manufacturing of baking mixes, jams, jellies, flavors, emulsion, mince meat, merringue powder, pie fillings, icings, fudges, devils food and fountain supplies. Our plant is located in Michigan. In answering please state age, where employed, education, salary desired and give references. P 8521, Food Industries.

SELLING OPPORTUNITY OFFERED

WELL-KNOWN British Food distributors with national sales force desire to contact manufacturers of all types of food products in cartons or cans who are interested in selling their goods in the United Kingdom. We prefer to deal with smaller manufacturers producing best quality foodstuffs who have original ideas on marketing and who will be guided by our experience of the British market. Please write full details to RW-6987, Food Industries.

EMPLOYMENT SERVICE

SALARIED PERSONNEL, $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

EXPORT MANAGER to expand your distribution. Available May 1, experience leading N. Y. food export firm, B.A., degree, marketing foreign trade. Young, married. PW 8648, Food Industries.

INDUSTRIAL ENGINEER—University trained. Age 35. Fifteen years industrial experience. Thorough knowledge, and training, in all phases of industrial engineering. Excellent background, in management, administration and organization, modern production methods and problems, and techniques of supervision. Well versed in the maintenance and operation of dry and wet line automatic packaging machinery. Successful employee relationship. Available as Chief Industrial Engineer, Maintenance, Production or Plant Superintendent. Full details and references upon request. PW 8667, Food Industries.

DIRECTOR OF Research and development. 30 years extensive experience in foods. M.S. in organic chemistry. PW 8736, Food Industries.

BAKERY SUPPLY CONSULTANT

Available to a limited number of new accounts to teach you the Know-How in making Jams & Jellies, Emulsions, Fudges, Powdered Mixes, etc.

PW-7632, Food Industries,
520 North Michigan Ave., Chicago 11, Ill.

POSITIONS WANTED

CHEMIST, EXP'D Essential oils and flavors, foods. Excellent sense of taste and smell. Young, personable, aggressive. Now employed. All correspondence confidential. In answer, please state position available and salary. PW 8771, Food Industries.

CHEMIST, RESEARCH and Production, with long experience in many phases of manufacture and development of confectionery, chocolate, gelatin desserts, puddings, macaroni and other food products, desires position of responsibility to fully use his ability. PW 8513, Food Industries.

FOOD TECHNOLOGIST, B.S., 12 years broad experience in research and development in preservation of frozen and other food. Desires administrative responsibilities in progressive expanding business requiring such knowledge and experience. PW 8705, Food Industries.

COURSES IN FOOD TECHNOLOGY

MEN OR WOMEN

Fundamentals and laboratory work in Canning, Freezing, Preserving, Science of Nutrition, Food Analysis, Mold Counting, Menu Planning. Night classes. Veterans paid while learning.

MIAMI SCHOOL
FOR FOOD PROCESSING SPECIALISTS
Box 383, Coral Gables 34, Florida

SALES REPRESENTATIVES WANTED

Manufacturer of efficient high pressure cleaning equipment, est. since 1860, desires sales representatives calling on food processing plants in selected territories. Company is presently selling to many of the largest food plants. The product has enthusiastic acceptance, proven performance where other equipment has not been satisfactory and original installations have brought many orders for additional equipment.

RW-8737, Food Industries
330 West 42nd Street, New York 18, N. Y.

INTERNATIONAL FOOD BROKERS

184 North 8th St. Brooklyn 11, N. Y.

Over 30 years in Metropolitan New York and New England. Selling raw materials, institutional and consumers products. Warehouse facilities. Food technologist on staff.

FOR SALE

Institutional Food Supply and manufacturing, big trade-name brands. Grossing $250,000 yearly, Central Michigan location. Will sell at value of inventory and equipment. Write

BO-8594, Food Industries
520 N. Michigan Ave., Chicago 11, Ill.

BUSINESS WANTED

Purchase or Partnership

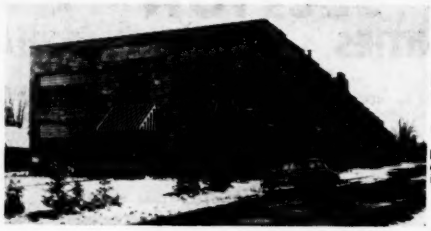
Will buy business manufacturing established products capable of producing annual net earnings in excess of $250,000.

Advertiser is nationally known as a business builder and money maker. Has held top management positions and directorships in 3 companies whose net earnings are in the multi-million dollar class. Age in middle forties.

Replies received in strict confidence either direct or through third party. Brokers protected.

BO-8649, Food Industries
330 West 42nd St., New York 18, N. Y.

Additional Business Opportunity & Auction Advertising on the following page



AUCTION

Auction Pursuant to an order of the Bankruptcy Court in the matter of Dundee Grape Juice Co., Inc., Bankrupt, we will sell at PUBLIC AUCTION on Wednesday, June 8th, 1949, 11:00 A. M., E. D. S. T. Land—Buildings, Machinery and Equipment will be sold in Bulk, Units, and Parcels. at 76 Seneca St., Dundee, N. Y. Situated in a good Grape and General Fruit locality.

Description of Real Estate

Cement Block Building, Built in 1944 with Railroad Siding Full Length of Bldg., all modern.

Cold Storage Room	85' x 60'	Boiler Room	20' x 44'
Compressor Room	16' x 60'	Fluorescent Lighting, Steam Heated 100 H.P.	
Press Room	30' x 60'	Farrar Trofts 125 lbs., steam pressure Boiler,	
Processing Room	40' x 60'	Iron Fireman Automatic Stoker with ½ Acre	
Offices	12' x 60'	parking lot opposite side of street.	
Garages	44' x 44'		

Machinery and Equipment Consisting of

Majonnier Filling & Capping Machine Model 90
Monitor Continuous Pasteurizer, 40' long 4' wide
CRCO American Vacuum Type Preheaters & Pasteurizers Model B15
45" Press Racks, Steel Slotted Crates, Sparkler Stainless Steel Filter, Model 18S12
2 Aluminum 60 Gal. Steam Jacketed Kettles
Majonnier Compact Cooler Stainless Steel Model 8560
Portable Farquar High Pressure Cleaning Unit
Huntley 42" Stainless Steel Basket
Cup Conveyor, Klotz Stemmer Style 3, size 108"
Howe 20 Ton Capacity Truck Scale
Stevedore Jr. Portable Electric Conveyor 5-5', 8-10', 2-45L, 1-90L
Quincy Air Compressor size 3x2½
½ Ton R&M Canners Hoist
Office Equipment
Styl-O-Matic Straight Line Unscrambler
2 Thomas Albright 45" Hydraulic Presses
O&J Automatic Labeler size SHJ Model R. H.
2 Concrete Block Wight Presses
2 International Agitators
2 Lee Stainless Steel 100 Gal. Cooking Kettles
2 Worthington Amonie Compressors Model VR60, 30 H. P. Motors
Pfautless Cooler
Niagara Aero Evaporative Condenser Model 2540
2 Niagara Fan Coolers Model 123R
14 Webster Cedar Storage Tanks, from 27,000 G. to 38000 G. capacity
3 Wood Tanks, 5,000 Gal. Capacity
1000 Gal. Juice Receiving Tank
Empire Juice Meter
6 Berlin Open Process Kettles
Troy Washing Machine
Platform Scales, 15 4 wheel Factory Trucks, Etc.

Sale subject to Confirmation by the Hon. Nelson P. Sanford, Referee in Bankruptcy.

Charles J. Briggs, Trustee, 39 Exchange St., Rochester, N. Y.; John K. Barden, Attorney for Trustee, Penn Yan, N. Y. Inspection by appointment only. For descriptive circular, appointment or information, write, wire, or phone

I. SHOOLMAN AND ASSOCIATES
Auctioneers, Appraisers Liquidators
Phone Hamilton 8120 — 825 Commerce Bldg. — Rochester 4, N. Y.

FOR SALE

One Majonnier 14-valve Vacuum Filling Machine, all stainless steel construction, with vacuum pump and 220-60-3 ph. motors. Separate capper (not included), at present fitted up for standard crown finish 12-oz. bottles. With proper attachments will handle containers up to 5" in diameter, good for any hot or cold product. Has had very little use since purchased by us as rebuilt machine from manufacturer. Immediate delivery, price f.o.b. Long Island City, $2,500.00.

One Crown Cork and Seal Model "D" Jumbo Crowning Machine, left hand infeed. In good condition fitted up for Standard 12-oz. bottles. Motor specifications 220-60-3 ph. Price f.o.b. Long Island City $650.00.

Brand new large Ammonia Compressors, motors and starters. Two 6½ x 6½ Howe Model G-20 Compressors, rated at 95.13 tons each at 360 R.P.M., with 40# suction pressure and 185# condensing pressure. Two Crocker-Wheeler 40 H.P. high torque 220-440-60-3 phase motors, with rails, pulleys and "V" belts. Two 50 H.P., Allen-Bradley Auto Transformer Type Compensator starters. Can make immediate shipment of any or all. Located in New York. Price: What is your offer?

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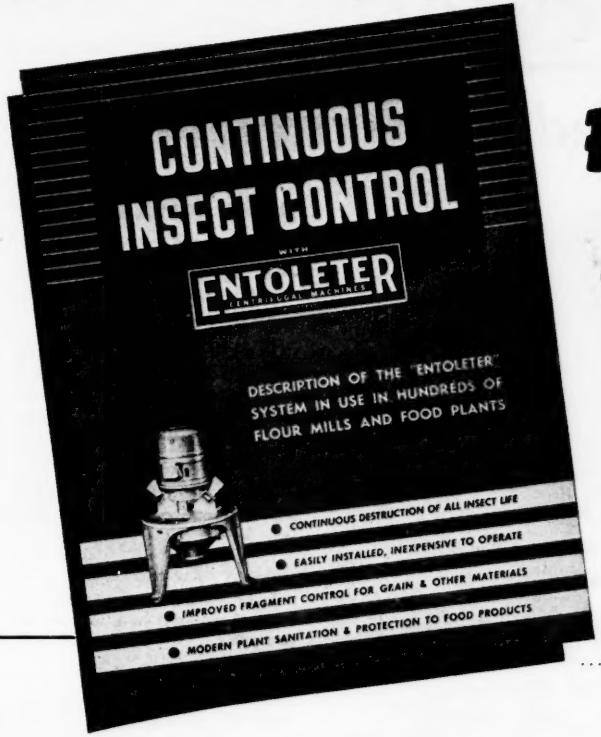
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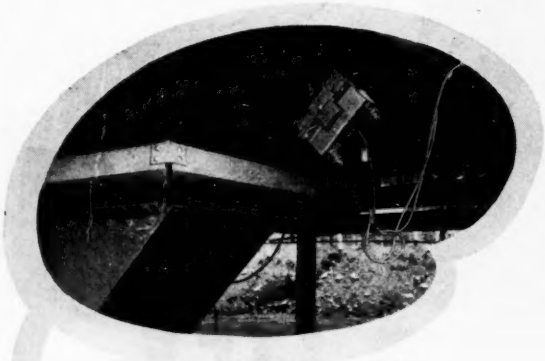

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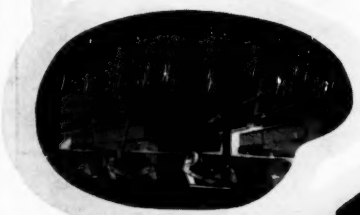

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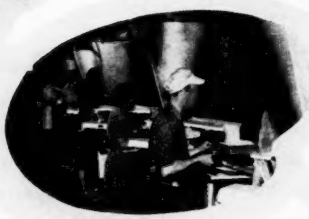

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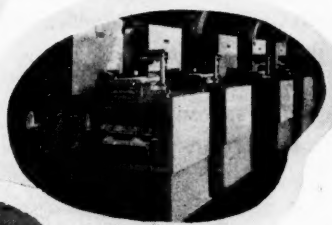

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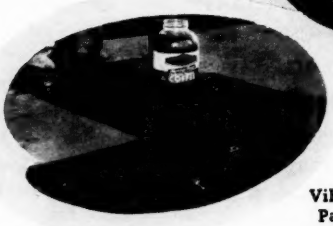

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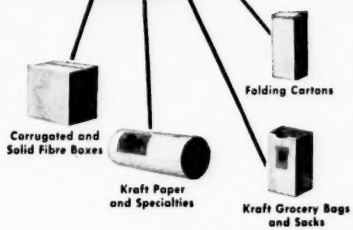

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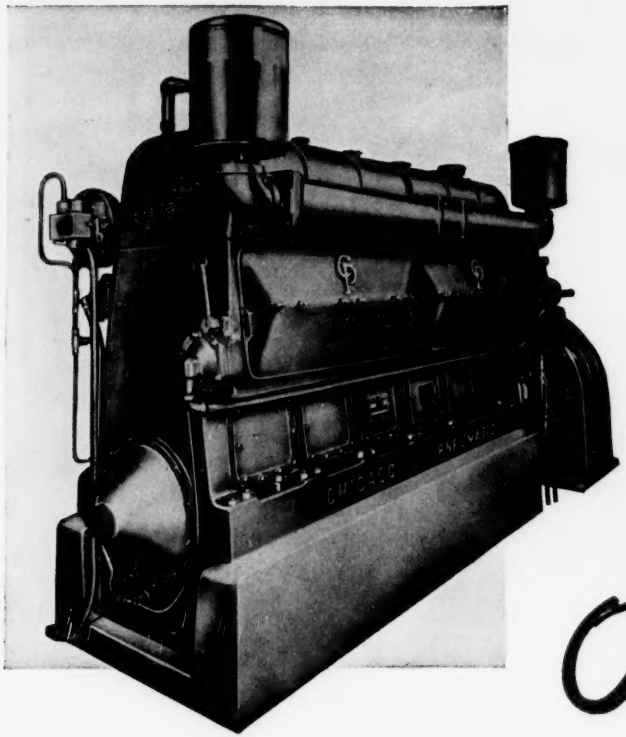

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